

STUDY NO. 03-6141

LIQUIFIED PETROLEUM GAS:

A 13-WEEK WHOLE-BODY INHALATION TOXICITY STUDY IN THE RATS

WITH NEUROTOXICITY ASSESSMENTS AND *IN VIVO*

GENOTOXICITY ASSESSMENTS

Final Report

Volume I of IV

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1220 L Street, Northwest
Washington, D.C. 20005-4070

Attn: [REDACTED]

Date: 23 April 2010

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GLP STATEMENT

This study was conducted in compliance with the United States Environmental Protection Agency's Good Laboratory Practice Standards 40 CFR Part 792 (TSCA) and with the Organization for Economic Cooperation and Development (OECD) Principles of Good Laboratory Practices ENV/MC/CHEM/(98)17. The micronucleus evaluation was also conducted in compliance with the UK Good Laboratory Practice Regulations (Statutory Instrument 1999 No. 3106, as amended by Statutory Instrument 2004 No. 994). The statistical analysis of the neurobehavioral data was also conducted in compliance with principles of Good Laboratory Practice Standards as set forth in: The UK Good Laboratory Practice Regulations (Statutory Instrument 1999 No 3106 as amended by Statutory Instrument 2004 No. 994) and EC Commission Directive 2004/10/EC of 11 February 2004 (Official Journal No L 50/44). The following exceptions to the above requirements occurred that were not considered to have affected the integrity of the study:

1. Test substance characterization and storage stability testing was not performed in a GLP compliant laboratory.
2. For the Micronucleus test:
The identity, strength, purity and composition or other characteristics to define the positive control material has not been determined by the Testing Facility. The positive control material has been characterized as per the Certificate of Analysis on file with the Test Facility. The stability of the positive control material has not been determined by the Testing Facility. Analyses to determine the uniformity (as applicable) or concentration of the positive control mixture were not performed by the Testing Facility. The stability of the positive control material mixture has not been determined by the Testing Facility.

[Redacted Signature]

[Redacted Name]

[Redacted Title]

[Redacted Address]

23 APR 10
Date

2/19/10
Date

SIGNATURE PAGE**SCIENTISTS**

The following Scientists were responsible for the overall conduct of this study. Departmental supervisory personnel are listed on the personnel page of this report (Appendix CC).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

23 APR 10

Date

19 Feb 2010

Date

SCIENTIFIC REVIEW

The following Scientist has reviewed and approved this report:

[REDACTED]

[REDACTED]

19 MAR 2010

Date

¹ Wanda B. High was the Study Pathologist for this study and for submission of the draft report and is no longer employed at the Testing Facility. Dianne Creasy is assuming responsibility for finalization of the pathology evaluation of this report.

² Keith P. Hazelden was the original scientific reviewer of this report and is no longer employed at the Testing Facility. Robert M. Parker is assuming responsibility for final review of this report.

QUALITY ASSURANCE STATEMENT

Listed below are the dates that this study was inspected by the Quality Assurance Unit of Huntingdon Life Sciences, East Millstone, New Jersey, and the dates that findings were reported to the Study Director and Management. This report reflects the raw data as far as can be reasonably established.

Type of Inspection	Date(s) of Inspection	Reported to Study Director and Management
GLP Protocol Review	22-25 Mar 05	25 Mar 05
Exposure Monitoring and Equipment Records	20 Apr 05	28 Apr 05
Functional Observational Battery Evaluations and Motor Activity	16 May 05	16 May 05
Body Weight and Feeder Weight Data Collection	8 Jun 05	8 Jun 05
Exposure Monitoring and Equipment Records	24 Jun 05	28 Jun 05
Estrous Smears and Training Records	6 Jul 05	6 Jul 05
Terminal Necropsy, Sperm Analysis and Genotoxicity Necropsy	20 & 21 Jul 05	21 Jul 05
Neuropathology Necropsy	26 & 28 Jul 05	29 Jul 05
Draft Final Report and Study Data	17, 18, 21, 23, 27-29 Nov & 1, 2 & 5-9 Dec 05	9 Dec 05
Inhalation Analytical Data and Report	8 Dec 05	8 Dec 05
Protocol Amendments 1-3	17 Apr 06	17 Apr 06
Final Report Review	3, 6 & 7 Apr 09	8 Apr 09
Statistical Analysis Report & Study Data	20-22, 26 & 27 May 09	27 May 09
Sperm Motility (Groups 2 & 3), Morphology (Groups 1-4) & Protocol Amendments Nos. 4 & 5	29 Jan & 1 Feb 10	1 Feb 10

23 Apr 10
Date

**LIQUIFIED PETROLEUM GAS:
A 13-WEEK WHOLE-BODY INHALATION TOXICITY STUDY IN
RATS WITH NEUROTOXICITY ASSESSMENTS AND *IN VIVO*
GENOTOXICITY ASSESSMENTS**

SUMMARY

This study was designed to assess the potential inhalation toxicity of liquified petroleum gas (LPG), an industrial gas, when administered via whole-body exposures to rats for 13 weeks. The assessment included routine toxicology parameters as well as detailed evaluations of neurotoxicity and genotoxicity parameters.

Sprague-Dawley CD[®] rats (15/sex/group) were exposed for six hours per day to 0 (air control), 1000, 5000 or 10000 ppm of LPG for 5 days per week for 13 consecutive weeks (note: highest exposure concentration was selected for safety reasons and approximated 50% of the lower explosive limit). The exposure levels were determined using an infrared spectrophotometer (IR) 4 times per chamber per day. Particle size distribution measurements were also made once weekly using a TSI Aerodynamic Particle Sizer. At the end of the treatment period, all animals were euthanized and necropsied. The following parameters were evaluated: viability, clinical observations, body weights, feed consumption, functional observation battery and motor activity, estrus cycles, sperm assessments, micronucleus assessment, clinical pathology, organ weights, macroscopic and microscopic observations.

The mean ($\pm$ standard deviation) analytical exposure concentrations of LPG were determined to be 0.0 ± 0.0 , 1019 ± 58 , 5009 ± 174 and 9996 ± 261 ppm for the air control and the exposure groups, respectively. Particle sizing results indicated that the atmospheres were essentially gas/vapor only, as expected, since there was no substantial difference in particle concentration between the test substance chambers and the air control chamber. Analysis of the major components in the neat test substance and the test atmospheres showed an acceptably close comparison between the neat test substance and the vaporized test substance. The data were consistent pretest and during the study indicating stability of the test substance and the atmosphere generation techniques.

All animals (except one female animal exposed at the 10000 ppm level) survived to termination. There were no exposure-related differences in the test substance exposed animals compared to the air control animals.

In conclusion, 13 weeks of exposure of rats to liquified petroleum gas resulted in no adverse effects of exposure. Therefore, the 10000 ppm exposure level was considered a no observed adverse effect level (NOAEL).

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1. INTRODUCTION

This study was designed to assess the potential inhalation toxicity of liquified petroleum gas, an industrial gas, when administered via whole-body exposures to rats for at least 13 weeks. The assessment included routine toxicology parameters as well as detailed evaluations of neurotoxicity and genotoxicity parameters.

2. MATERIALS AND METHODS**2.1. STUDY MANAGEMENT****2.1.1. SPONSOR**

American Petroleum Institute (API)
1220 L Street, Northwest
Washington, D.C. 20005-4070

2.1.2. SPONSOR REPRESENTATIVE

Thomas M. Gray, M.S., D.A.B.T.

2.1.3. TESTING FACILITY

Huntingdon Life Sciences (HLS)
100 Mettlers Road
East Millstone, New Jersey 08875-2360

2.1.4. STUDY DIRECTOR

Gary M. Hoffman, B.A., D.A.B.T.

2.2. STUDY DATES**2.2.1. STUDY INITIATION**

7 April 2005 (date study director signed the protocol)

2.2.2. DATE OF ANIMAL RECEIPT

5 April 2005 (experimental start date)*

2.2.3. EXPOSURE INITIATION

20 April 2005 (experimental start date)**

*as per OECD GLPs; **as per EPA GLPs

2.2.4. EXPOSURE TERMINATION

26 July 2005

2.2.5. TERMINAL SACRIFICE

20/21/22 July 2005 (main/genotoxicity study animals)

26/27 July 2005 (neuropathology study animals)

2.2.6. EXPERIMENTAL TERMINATION

19 February 2010 (date of last data collection = date final report is signed by the pathologist)

2.2.7. STUDY COMPLETION

23 April 2010 (date final report is signed by the study director)

2.3. EXPERIMENTAL OUTLINE

Group	Exposure Level ^a (ppm)	Number of Animals (MAIN and RECOVERY STUDIES)							
		Initial		Clinical Laboratory Studies		Necropsy ^b		Microscopic Pathology	
				Terminal		Terminal		Terminal	
		M	F						
1 (control)	0 (air only)	10	10	10	10	10	10	10	10
2 (low)	1000	10	10	10	10	10	10	A.R.	A.R.
3 (mid)	5000	10	10	10	10	10	10	A.R.	A.R.
4 (high)	10000	10	10	10	10	10	10	10	10

^aExposures were 6 hours/day, 5/days/week for 13 weeks for at least 65 exposures for the main study. Exposure levels are expressed as ppm of test substance. The exposures were conducted via whole-body exposure. Exposure levels were determined by a range-finding study 03-6140.

^bComplete postmortem evaluations were performed on animals which were euthanatized in a moribund condition during the course of the study.

A.R. = As required: 1) Target organs/tissues identified by Group 4 evaluations at terminal sacrifice; 2) Lungs were examined microscopically for all animals in all groups at the terminal sacrifice interval; 3) All tissues from animals found dead or euthanatized in a moribund condition during the course of the study; 4) Gross lesions.

M = Male; F = Female. The first day of exposure was day 0 for the study.

2.3. EXPERIMENTAL DESIGN (CONTINUED)

Group	Exposure Level ^a	Number of Animals (SATELLITE STUDIES)			
		Neuropathology		Genotoxicity ^b (Micronucleus)	
		M	F	M	F
1 (control)	0 (air only)	5	5	5	5
2 (low)	1000	5	5	5	5
3 (mid)	5000	5	5	5	5
4 (high)	10000	5	5	5	5
5 (positive control)	40 mg/kg	0	0	5	5

^aExposures were 6 hours/day, 5 days/week for 13 weeks for at least 65 exposures for the neuropathology and genotoxicity studies. Exposure levels were expressed as ppm of test substance. The exposures were conducted via whole-body exposure. Exposure levels were determined by a range-finding study 03-6140.

^bThe genotoxicity animals for Groups 1 to 4 were not separate animals but were selected from the main study animals outlined on the prior page. For the genotoxicity evaluation, a separate group (Group 5) of animals (5/sex) was used as positive control animals for these evaluations. These positive control animals were given a dose of 40 mg/kg cyclophosphamide (CP) intraperitoneally (IP) within 24 hours prior to sacrifice. These positive control animals were not chamber exposed prior to dosing and sacrifice. The CP solutions prepared for dosing were **not** assayed for purity, uniformity and stability as per GLP's.

M = Male; F = Female; The first day of exposure was day 0 for the study.

2.4. JUSTIFICATIONS

2.4.1. ROUTE, DURATION AND FREQUENCY OF ADMINISTRATION

The inhalation route is one of the potential routes of human exposure to this test substance. The duration and frequency of the exposures are as recommended in the relevant OECD and EPA guidelines (see section 2.24.1).

2.4.2. TEST ANIMAL SELECTION

The rat is used as a surrogate for humans in the detection of toxicity and is a species in which known toxicants and mutagens have been detected. This rodent species is commonly used in the conduct of toxicity studies and is that recommended by the relevant OECD and EPA guidelines (see section 2.24.1). Historical control data are also available with this strain of rat for comparative evaluation.

2.4.3. NUMBER OF ANIMALS

The number of animals in this study was considered the minimum necessary to allow for meaningful interpretation of the data as required by OECD and EPA guidelines (see section 2.24.1). This includes a guideline required positive control group for the genotoxicity evaluation.

2.4.4. EXPOSURE LEVEL SELECTION

LPG: Based on results of range-find testing (HLS study no. 03-6140, see Appendix AA) which showed no effects at 10000 and 1000 and 100 ppm. The exposure levels were also selected based on establishing (for safety reasons) the high exposure level as no more than 50% of the lower explosion limit ($LEL = 2.1\% = 21000 \text{ ppm}$) for the test substance.

CP: Based on results of 7 prior studies (e.g. HLS study no. 00-6125) at this Testing facility, the single IP dose of 40 mg/kg (in the absence of a similarly practical and effective inhalable agent) has been shown to cause a significant genotoxic effect to

demonstrate the sensitivity of this colony of test animals to a genotoxic agent.

2.5. TEST SUBSTANCE

Liquified Petroleum Gas

2.5.1. TEST SUBSTANCE CATEGORY

Industrial gas

2.5.2. SUPPLIER

ChevronTexaco Energy Research & Technology Company
100 Chevron Way
Richmond, CA 94802

2.5.3. LOT NUMBER

120701-01

2.5.4. PURITY

100% LPG (see sponsor's analytical report in Appendix U)

2.5.5. DESCRIPTION

Colorless gas or liquid in pressurized cylinders

2.5.6. DATE RECEIVED

30 August 2004

2.5.7. EXPIRATION DATE

31 December 2007

2.5.8. ANALYSIS

Documentation of the identity, strength, composition, and method of synthesis, fabrication and/or derivation of each batch of the test substance and the maintenance of these records was the responsibility of the sponsor. This documentation is maintained by the sponsor. The storage stability was the responsibility of the

sponsor but the stability of the test substance under the condition of use was the responsibility of the testing facility.

2.5.9. STORAGE

Liquified petroleum gas was stored (ambient conditions) in an outside solvent shed except when in use in the inhalation laboratory. The test substance was handled as a flammable gas.

2.5.10. ARCHIVAL SAMPLE

The sponsor arranged for storage of an archival sample at a contract archival facility (EPL Archives, Inc., 45610 Terminal Drive, Sterling, VA 20166). Since multiple studies (03-6140 & 03-4253 and this study) were conducted with the same test substance, a common archival sample was taken and appropriately labeled. The testing facility arranged for safe transportation on 15 September 2005 of the archival sample to the archival facility, in compliance with all applicable regulations.

2.5.11. DISPOSITION

Following completion of the final study with this test substance, the testing facility informed the sponsor of the volume of remaining test substance as well as the number of test substance containers. The sponsor then instructed the testing facility to ship the test substance and containers to Chevron and this was done on 11 January 2007. No test substance or container (even empty ones) will be disposed of until the issuance of the final report.

2.6. POSITIVE CONTROL SUBSTANCE

Cyclophosphamide monohydrate (CP)

2.6.1. SUPPLIER

Sigma Aldrich, Inc.
3050 Spruce Street
Saint Louis, MO 63103

2.6.2. LOT NUMBER

084K1328

2.6.3. PURITY

99.7%

2.6.4. DESCRIPTION

White to off-white powder

2.6.5. DATE RECEIVED

26 June 2005

2.6.6. EXPIRATION DATE

August 2007

2.6.7. ANALYSIS

Documentation of the identity, strength, purity, composition, stability, and synthesis, fabrication, and/or derivation of the positive control substance and the maintenance of these records were the responsibility of the supplier.

2.6.8. STORAGE

Refrigerated at 2 to 8 °C

2.6.9. ARCHIVAL SAMPLE

A sample from each lot of positive control substance is stored in the archives of the testing facility under conditions specified for positive control substance storage.

2.6.10. DISPOSITION

The unused portion of the positive control substance and any empty control substance containers will be retained for future studies or disposed upon submission of the final report.

2.7. TEST ANIMALS**2.7.1. SPECIES**

Albino Rats (Outbred) VAF/Plus®
CD® (Sprague-Dawley derived) [CrI: CD® IGS BR]

2.7.2. SUPPLIER

Charles River Laboratories
Kingston, New York 12484

2.7.3. NUMBER OF ANIMALS

Received:
148 total (74 males, 74 females)

Placed on test:
130 total (65 males, 65 females)

2.7.4. AGE AT RECEIPT AND AT INITIATION OF EXPOSURE

Study Phase	Age at Receipt (weeks)	Age at Exposures Initiation (weeks)
Main/Genotoxicity	~6	~8
Neuropathology	~6	~8

Note: Females were nulliparous and non-pregnant.

2.7.5. WEIGHT AT INITIATION OF EXPOSURE (MAIN STUDY)

	Mean (grams)	Range (grams)
Male:	280.0	243 to 308
Female:	209.1	187 to 231

Individual weights of animals placed on test were within $\pm 20\%$ of the mean weight for each sex.

2.7.6. ACCLIMATION PERIOD

Animals were acclimated for approximately two weeks. All animals were checked for viability twice daily. All animals were

examined during the acclimation period to confirm suitability for study.

2.8. ANIMAL ASSIGNMENT

More animals than required for the study were purchased and acclimated. Animals considered suitable for study on the basis of pretest physical examinations, body weight data and pretest ophthalmology evaluations were randomly assigned, by sex, to control or treated groups in an attempt to equalize mean group body weights. Disposition of all animals not utilized in the study are maintained in the study file.

2.9. ANIMAL IDENTIFICATION

Each rat was assigned a temporary number upon receipt. Each rat was identified with a metal ear tag bearing its assigned animal number. The assigned animal number plus the study number comprised the unique animal number for each animal. If the tag was lost, it was replaced. In addition, each cage was provided with a cage card, which was color-coded for exposure level identification and contained study number and animal number information.

2.10. VETERINARY CARE

Animals were monitored by the technical staff for any conditions requiring possible veterinary care and treated as necessary. If any such conditions were identified, a staff veterinarian was notified for an examination and evaluation. Animals were treated as outlined in the Animal Welfare Act Compliance section of the protocol. The staff veterinarian approved the animals for inclusion on test.

2.11. HUSBANDRY DURING NON-EXPOSURE PERIODS

2.11.1. FACILITIES MANAGEMENT/ANIMAL HUSBANDRY

Currently acceptable practices of good animal husbandry were followed e.g., *Guide for the Care and Use of Laboratory Animals*; National Academy Press, 1996. Huntingdon Life Sciences, East Millstone, New Jersey is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC).

2.11.2. HOUSING

Animals were housed individually in suspended stainless steel wire mesh cages. Cages were arranged in such a way (rotated racks within the room) that possible effects due to placement were minimized. Each cage was fitted to secure a glass feeder jar with a stainless steel lid. Clean feed jars and fresh feed was provided weekly for periods when feed consumption was not being recorded and at each interval when feed consumption was recorded.

2.11.3. FEED

Certified Rodent Diet, No. 5002; (Meal) (PMI Nutrition International, St. Louis, Missouri) was available without restriction. Fresh feed was presented weekly.

2.11.4. FEED ANALYSIS

Analysis of each feed lot used during this study was performed by the manufacturer. Results are maintained on file at the testing facility & included in the final report (Appendix X). There were no known contaminants in the feed which were expected to interfere with the results of this study.

2.11.5. WATER

Water (Elizabethtown Water Company, Westfield, New Jersey) was available without restriction via an automated watering system.

2.11.6. WATER ANALYSIS

Monthly water analyses are conducted by Elizabethtown Water Company, Westfield, New Jersey (Raritan-Millstone Plant) to ensure that water meets standards specified under the EPA Federal Safe Drinking Water Act Regulations (40 CFR Part 141). In addition, water samples are collected biannually from representative rooms in the testing facility; chemical and microbiological water analyses are conducted on these samples by a subcontract laboratory (Benchmark Analytical, Center Valley, PA). Results of all water analyses are maintained on file at the testing facility & included in the final report (Appendix Y). There

were no known contaminants in the water, which were expected to interfere with the results of this study.

2.11.7. ENVIRONMENTAL CONDITIONS

Light/Dark Cycle

A twelve hour light/dark cycle controlled via an automatic timer was provided.

Temperature

Temperature was monitored in accordance with testing facility SOPs and maintained within the specified range to the maximum extent possible. Excursions (1 occasion) outside the specified range were not considered to have affected the integrity of the study.

Desired: 18 to 26°C

Actual: 17 to 25°C

Relative Humidity

Relative humidity was monitored in accordance with testing facility SOPs and maintained within the specified range to the maximum extent possible. Excursions (4 low occasions and 33 high occasions) outside the specified range (some related to the ceiling leak in the room which was noted on 8 July 2005 and repaired on 20 July 2005) were not considered to have affected the integrity of the study.

Desired: 30 to 70%

Actual: 22 to 99%

2.12. HUSBANDRY DURING EXPOSURE PERIODS

2.12.1. HOUSING

Animals were individually housed in stainless steel, wire mesh cages within a 1000 Liter stainless steel and glass whole-body exposure chamber, with the placement of the animals in chambers

rotated weekly to ensure uniform exposure of the animals. A description of the animal rotation is included in the raw data.

2.12.2. FEED

None was provided during exposure.

2.12.3. WATER

None was provided during exposure.

2.12.4. ENVIRONMENTAL CONDITIONS

Chamber static pressure was recorded every half-hour during exposure. Chamber temperature and relative humidity were recorded every half-hour during exposure and maintained, to the maximum extent possible, within the ranges presented below. Excursions outside the specified range were not considered to have affected the integrity of the study. Chamber oxygen levels (maintained at least 19%) were measured pretest and at the beginning, middle and end of the study.

Temperature

Desired: 20 to 24°C

Actual: 19 to 28°C

Relative Humidity

Desired: 40 to 60%

Actual: 22 to 61%

2.13. TEST SUBSTANCE ADMINISTRATION AND CHAMBER OPERATION**2.13.1. ROUTE OF ADMINISTRATION**

Inhalation via whole-body exposures.

2.13.2. FREQUENCY OF ADMINISTRATION

Once daily, 6 hours/day.

2.13.3. DURATION OF ADMINISTRATION

The test substance was administered for 6/hours/day, generally 5 days per week (test substance exposures were not conducted on days when neurobehavioral studies were performed) for 13 weeks for at least 65 exposures for main/neuropathology/genotoxicity studies. Test substance administration continued through the day prior to necropsy for all animals.

2.13.4. ADMINISTRATION OF TEST SUBSTANCE

The test substance was administered as a gas in the breathing air of the animals. The test atmosphere was generated by an appropriate procedure determined during pre-study trials. The trials were performed (at least three 6-hour periods) to evaluate the optimal set of conditions and equipment to generate a stable and uniform atmosphere at the target exposure levels.

2.13.5. EXPOSURE PROCEDURE

Group 1

Animals were exposed to room air only.

Groups 2, 3 and 4

Houseline nitrogen was delivered through a regulator and backpressure gauge via 1/4" tubing to the test substance cylinder to pressurize it. The test substance flowed from the cylinder via the liquid outlet through a quick-disconnect fitting (equipped with toggle valve) through a stainless steel filter and a quick-connect, to a 1/8" stainless steel tubing, to the 1/8" copper tubing coil. The copper coil was maintained in a warm water bath, and monitored by a thermometer. From the coil, the test substance flowed through a metering valve to a mass flowmeter, via 1/4" teflon tubing. The test substance exited the flowmeter and was directed via 1/4" tubing to the turret of a 1000 Liter stainless steel and glass exposure chamber, where it mixed with room air.

Refer to Figures 1 & 2 and Appendix P for equipment details.

2.13.6. CHAMBER OPERATION

The whole-body exposure chambers each had a volume of approximately 1000 Liters (1m³). Each chamber was operated at a minimum flow rate of 203 Liters per minute. The final airflow was set to provide at least one air change (calculated by dividing the chamber volume by the airflow rate) in 5.0 minutes (12 air changes/hour) and a T₉₉ equilibrium time (calculated by multiplying the air change by the exponential factor 4.6) of at most 23 minutes:

Group	Airflow Rate (Lpm)	Air Change (min)	T99 (min)
1	215	4.7	21
2	208	4.8	22
3	204	4.9	23
4	203	4.9	23

This chamber size and airflow rate was considered adequate to maintain the oxygen level at least 19% and the animal loading factor below 5%. At the end of each exposure, all animals remained in the chamber for a minimum of 30 minutes. During this time, each chamber was operated at approximately the same flow rate using clean air only. The chambers were exhausted through the in-house filtering system, which consisted of a coarse filter, a HEPA filter and activated charcoal.

See Figure 1 and Appendix P for equipment details.

2.13.7. EXPOSURE CONCENTRATION DETERMINATION

A nominal exposure concentration was calculated daily. The flow of air through the chamber was monitored using appropriate calibrated equipment (dry test meter). The test substance consumed during the exposure (weight difference of test substance cylinder) was divided by the total volume of air passing through the chamber (volumetric flow rate times total exposure time) to give the nominal concentration as follows:

$$\text{Conc (ppm)} = \frac{\text{amount consumed (g)} \times 1000 \text{ (mg/g)} \times 1000 \text{ (}\mu\text{g/mg)} \times 22.4 \text{ (}\mu\text{L/}\mu\text{mole)} \times 295^\circ\text{K}}{\text{exposure duration (min)} \times \text{airflow (Lpm)} \times \text{MW (}\mu\text{g/}\mu\text{mole)} \times 273^\circ\text{K}}$$

where average MW = 44μg/μmole

During each exposure, measurements of airborne concentrations were performed in the animals' breathing zone at least 4 times using an appropriate and infrared spectrophotometric analytical procedure (samples assayed at 10.9 μm wavelength). Also, one sample (gas tight syringe) per chamber per week (as well as at start and end of the pre-study trials) was analyzed by gas chromatography (GC) to characterize at least 5 major components (comprising at least 90% by weight of the test substance) to show test substance stability and comparison between the neat test substance and the test atmospheres.

See Appendices P and Q for equipment details. See Appendix U for Analytical Report.

2.13.8. PARTICLE SIZE DISTRIBUTION ANALYSIS

During each week of exposure, particle size determinations were performed using a TSI Aerodynamic Particle Sizer to characterize the aerodynamic particle size distribution of any aerosol present. The samples were drawn for 20 seconds at a flow rate of 5.00 Lpm. The mass median aerodynamic diameter, geometric standard deviation and total mass concentration were calculated based on the amount of particles collected.

See Appendix P for equipment details.

2.13.9. CHAMBER AND EXPOSURE ROOM ENVIRONMENT

Chamber oxygen levels (maintained at least 19%) were measured pretest and at the beginning, middle and end of the study. Air samples were taken in the vapor generation area pretest and at the beginning, middle and end of the study. Light (maintained approximately 30 to 40 foot-candles at 1.0 meter above the floor) and noise levels (maintained below 85 decibels) in the exposure room were measured pretest and at the beginning, middle and end of the study.

See Appendix P for equipment details.

2.14. EXPERIMENTAL EVALUATIONS

2.14.1. VIABILITY CHECKS (IN-CAGE)

Animals were observed in their cages twice daily for mortality and signs of severe toxic or pharmacologic effects. Animals in extremely poor health or in a possible moribund condition were identified for further monitoring and possible euthanasia.

2.14.2. PHYSICAL EXAMINATIONS

Out-of-Chamber: Each animal on study (except neuropathology animals) was removed from its cage and was examined twice pretest and once weekly during the study period. Examination included observations of general condition, skin and fur, eyes, nose, oral cavity, abdomen and external genitalia, occurrence of secretions and excretions, and autonomic activity (e.g., lacrimation, piloerection, pupil size, unusual respiratory pattern). Changes in gait, posture and response to handling as well as the presence of clonic or tonic movements, stereotypy (e.g., excessive grooming, repetitive circling) or bizarre behavior (e.g., self-mutilation, walking backward) were recorded as well as evaluations of respiration, palpation for tissue masses, circulatory effects, central nervous system effects, changes in motor activity, and reactivity to handling or sensory stimuli. During the treatment period, these evaluations were performed prior to exposures. Neuropathology animals were removed from their cages and examined once pretest before selection onto study.

In-Chamber: All animals were observed as a group at least once during each exposure. This was routinely performed near the middle of each exposure. Pertinent behavioral changes and all signs of toxicity, including mortality, were recorded. These signs included time of onset, degree and duration.

2.14.3. OPHTHALMOSCOPIC EXAMINATION

All animals were examined pretest and at study termination. Eyelids, lacrimal apparatus and conjunctiva were examined grossly; cornea, anterior chamber, lens, vitreous humor, retina and optic disc were examined by indirect ophthalmoscopy. The eyes were examined

after instillation of a mydriatic (Tropicamide Ophthalmic Solution 1%).

2.14.4. BODY WEIGHT

Body weights were recorded for all animals at the time of randomization into test groups, on the day that treatment was initiated and weekly thereafter throughout the study. Terminal, fasted weights were obtained just prior to necropsy.

2.14.5. FEED CONSUMPTION

Feed consumption was measured (weighed) during the week prior to treatment initiation and weekly throughout the study. Feed was available without restriction 7 days/week except during inhalation exposures and when fasting prior to blood collection. Animals were presented with weighed feeders at the scheduled intervals. After 6 to 7 days, the feeders were reweighed and the resulting weight subtracted from the initial feeder weight to obtain the grams of feed consumed per animal per week. The grams consumed per kilogram of body weight per day was then calculated for each animal as follows:

Feed Consumption (g/kg/day) = grams of feed consumed ÷ 6 or 7 days body weight (kg)^a

^aAverage of previous and current measurement

2.15. NEUROBEHAVIORAL STUDIES

Testing was staggered over 5 sessions and was conducted on non-exposure days at least 16 hours post-exposure. Each session consisted of 10/sex/group. Testing was performed on the main study (5/sex/group) and all neuropathology animals. Noise level was maintained within a level of 55 to 65 decibels by a white noise generator. Temperature, humidity and illumination was measured and recorded to ensure that variations in environmental conditions are minimal during all evaluations. The functional observational battery was performed for all animals before evaluation of motor activity.

2.15.1. FUNCTIONAL OBSERVATIONAL BATTERY

Method

A functional observational battery (Moser, 1989) was performed on all animals. With the exception of pretest, evaluations were performed "blind", i.e., the observer did not know the identity of the animal's exposure group. Time of testing was balanced across treatment groups.

The following evaluations were performed as part of the functional observational battery:

Home Cage Evaluations: posture, vocalization, palpebral closure and motor movements.

Handling Evaluations: ease of removal from cage; reactivity to general stimuli (handling); assessment of signs of autonomic function: chromodacryorrhea, lacrimation, salivation, altered fur appearance, or red/crusty deposits around eyes.

Open Field Evaluations: arousal level and gait; count of urination and defecation; convulsions, tremors, abnormal movements or behaviors, locomotion, excessive or repetitive actions; piloerection and exophthalmos.

Reflex Assessments: response to visual (approach response) and auditory (finger snap) stimuli; response to a tail pinch; pupillary function, proprioception and pinna reflex (light touch in ear).

Grip Strength (Meyer *et al.*, 1979): Grip strength was measured using a Grip Strength Meter (Columbus Instruments International Corporation, Columbus, Ohio).

Hindlimb Extensor Strength: Animals were held in a vertical position facing the observer with a firm grasp around the thorax. The observer placed one finger against the bottom of each hindpaw and pressed towards the animal. Muscular resistance and pressure exerted by the animals were scored.

Landing Foot Splay: Each animal was dropped into a pan of sand from a height of one foot. The distance between the marks left by the hindpaws was measured in centimeters.

Air Righting Ability: Animals were held upside down and dropped from a height of one foot into a container of bedding. The landing position of each animal was recorded.

Body Weight: Animals were removed from their cages and weighed.

Body Temperature: Animals were removed from their cages and rectally measured for body temperature using a digital thermometer.

Frequency

Pretest and during the 2nd, 4th, 8th and 13th weeks of exposure

Temperature

Temperature was monitored and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 18 to 26°C

Actual: 20 to 23°C

Relative Humidity

Relative humidity was monitored and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 30 to 70%

Actual: 36 to 72%

Noise Level

Noise level was monitored using a Digital Sound Level Meter (Sper Scientific, Ltd., Scottsdale, Arizona) and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 55 to 65 dB

Actual: 60 dB

Illumination

Illumination was monitored using a Photometer 1 (Quantum Instruments, Inc., Garden City, New York) and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 80 footcandles

Actual: 65 to 67 footcandles

2.15.2. MOTOR ACTIVITY

Method

Using a modified version of Schulze's procedures (Schulze, 1990), the locomotor activity of all animals was monitored using an automated Photobeam Activity System (San Diego Instruments, Inc., San Diego, California). Sessions were 60 minutes in length; each session was divided into 12 intervals of 5 minutes. The time of testing was balanced across treatment groups.

Frequency

Pretest and during the 2nd, 4th, 8th and 13th weeks of exposure

Temperature

Temperature was monitored and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 18 to 26°C

Actual: 22 to 24°C

Relative Humidity

Relative humidity was monitored and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 30 to 70%

Actual: 36 to 68%

Noise Level

Noise level was monitored using a Digital Sound Level Meter (Sper Scientific, Ltd., Scottsdale, Arizona) and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: 55 to 65 dB

Actual: 60 to 63 dB

Illumination

Illumination was monitored using a Photometer 1 (Quantum Instruments, Inc., Garden City, New York) and recorded twice daily, just prior to the first evaluation and just after the last evaluation.

Desired: <80 footcandles

Actual: 49 to 67 footcandles

2.16. ESTROUS CYCLICITY

Daily vaginal smears were taken at approximately the same time each day, and the stage of estrus was determined for each female (main study animals) for three weeks prior to and on the day of termination. Care was taken to ensure that pseudo-pregnancy was not induced (however, pseudo-pregnancy was induced in 6 animals – see Section 3.7. for details).

2.17. CLINICAL LABORATORY STUDIES

Clinical pathology procedures and parameters were based on those recommended in guidelines published by the Joint Scientific Committee for International Harmonization of Clinical Pathology Testing in “Harmonization of Animal Clinical Pathology Testing in Toxicity and Safety Studies”, *Fund. Appl. Tox.*: 29: 198-201 (1996). Blood was obtained from lightly anesthetized (carbon dioxide/oxygen; 60%/40%) animals via puncture of the orbital sinus (retrobulbar). Rats were fasted overnight prior to blood collection. The main study animals (up to 10/sex/group) were bled at the terminal interval.

2.17.1. HEMATOLOGY

Blood for hematology studies was collected (approximately 0.25 mL) into tubes containing EDTA anticoagulant.

Blood samples were analyzed as follows:

ADVIA 120 Hematology Analyzer, Bayer Corporation.

Hemoglobin concentration

Hematocrit

Erythrocyte count

Platelet count

Mean platelet volume

Mean corpuscular volume

Mean corpuscular hemoglobin

Mean corpuscular hemoglobin concentration

Red cell distribution width

Total leukocyte count

Reticulocyte count

Differential leukocyte count¹

Other

Erythrocyte and platelet morphology (*Henry, 1991*)

2.17.2. COAGULATION

Blood for coagulation studies was collected (approximately 1.0 mL) into tubes containing sodium citrate anticoagulant.

Serum samples were analyzed as follows:

Mechanical clot detection system, STA Compact[®], Diagnostica Stago Products

Prothrombin time

Activated partial thromboplastin time

¹When questionable values were obtained, manual differential leukocyte counts (*Henry, 1991*) and absolute value calculations were performed for verification.

2.17.3. CLINICAL CHEMISTRY

Blood for clinical chemistry was collected (approximately 1.0 mL) into tubes with no anticoagulant, allowed to clot, and centrifuged to obtain serum.

Serum samples were analyzed as follows:

Hitachi 717, Roche Corporation Automatic Analyzer

Aspartate aminotransferase (*Kinetic - Modified IFCC Technique*)

Alanine aminotransferase (*Kinetic - Modified IFCC Technique*)

Alkaline phosphatase (*Kinetic - Modified AMP Buffer*)

Lactate dehydrogenase (*Kinetic - Lactate-pyruvate Technique*)

Blood urea nitrogen (*Kinetic - Modified Urease*)

Creatinine (*Kinetic - Modified Jaffe Method*)

Glucose (*Hexokinase Method*)

Creatine kinase (*Kinetic - Modified NAC Method*)

Cholesterol (*Enzymatic - Modified Trinder Method*)

Total protein (*Biuret Technique*)

Albumin (*Bromocresol Green Method*)

Total bilirubin (*Modified Wahlefeld et al.*)

Direct bilirubin (*Modified Jendrassik and Grof Method*)

Sodium (*Ion Selective Electrode*)

Potassium (*Ion Selective Electrode*)

Chloride (*Ion Selective Electrode*)

Calcium (*Cresolphthalein Complexone Method*)

Inorganic phosphorus (*Phosphomolybdate - UV Method*)

Gamma-glutamyl transferase (*Kinetic - Modified Persijn and Vander Silk Method*)

Triglycerides (*GPO Triglyceride-lipase Method*)

Other

Globulin (*calculated value; total protein - albumin*)

Albumin/globulin ratio (*calculated value; albumin ÷ globulin*)

Indirect bilirubin (*calculated value; total bilirubin - direct bilirubin*)

2.17.4. RETENTION/STORAGE OF SPECIMENS

Any remaining (frozen) serum, which may have limited storage stability, will be stored for up to six months after completion of assays and will then be discarded. Peripheral blood smears will be retained and archived with the study.

2.18. GENOTOXICITY EVALUATIONS

Sprague Dawley-derived (CD[®]) rats, 5/sex/group, were exposed to liquified petroleum gas by inhalation at exposure levels of 0, 1000, 5000 or 10000 ppm for a 13 week (5 days per week) exposure period. A group of non-exposed (5/sex) positive control animals (40 mg/kg cyclophosphamide, injected intraperitoneally with a 4.0 mg/mL solution @ 10 mL/kg, within 24 hours prior to sacrifice) were also dosed. The test animals were sacrificed under carbon dioxide anesthesia. The time between last exposure and tissue harvest was approximately 18 to 24 hours. The right femurs were removed and sampled. Unstained slides (4 per animal – 2 for shipment and 2 for retention) were prepared and shipped to HLS, Eye Research Centre, Suffolk, UK. Upon receipt, slides were stained (Acridine orange) and evaluated using a fluorescent microscope for determination of micronucleus response. The Subcontractor was responsible for the QA inspection and audit of the conduct and reporting of the evaluations phase according to their own procedures. The testing facility's quality assurance department acted as lead QA to ensure that there was adequate quality assurance inspection coverage at the test site throughout the study.

See Appendix Z for genotoxicity report.

2.19. POSTMORTEM EVALUATIONS

2.19.1. NECROPSY INFORMATION

Necropsy of all animals surviving to study termination was performed after animals had been treated for the appropriate duration. Animals were fasted overnight prior to necropsy. A necropsy schedule was established to ensure that approximately equal numbers of males and females were examined on each day of necropsy and that examination of animals of both sexes were performed at similar times of the day throughout the necropsy period. Animals showing signs of severe debility, particularly if

death appeared imminent, were euthanized to prevent loss of tissues through autolysis.

Method of Euthanasia

Exsanguination following carbon dioxide inhalation for main study animals.

2.19.2. MACROSCOPIC EXAMINATIONS

Complete macroscopic postmortem examinations were performed on all main/neuropathology animals including animals euthanatized in a moribund condition; all abnormal observations were recorded. The necropsy included examination of the external surface and all orifices; the external surfaces of the brain and spinal cord, the organs and tissues of the cranial, thoracic, abdominal and pelvic cavities and neck; and the remainder of the carcass.

2.19.3. ORGAN WEIGHTS

Organs indicated in Table I (page 36) were taken from all main study animals at the scheduled necropsy, weighed, recorded and organ/body and organ/brain weight ratios calculated. Organs were not weighed for animals euthanatized in a moribund condition during the course of the study. Prior to weighing, all organs were carefully dissected and properly trimmed to remove fat and other contiguous tissue in a uniform manner. Organs were weighed as soon as possible after dissection to avoid drying except the thyroid/parathyroids which were weighed after fixation. Paired organs were weighed together.

2.19.4. TISSUES PRESERVED AND EXAMINED HISTOPATHOLOGICALLY

The tissues listed in Table I (page 36) were obtained at the scheduled sacrifice intervals as well as for the unscheduled sacrifice animal #4812 and preserved for all main study animals. In addition, slides of the indicated tissues were prepared and examined microscopically for all main study animals. Any abnormalities not noted during macroscopic examinations which were seen during histology processing were recorded.

TABLE I

Tissue ^a	Preserved	Weighed	Microscopic Examination (Groups)	
			1, 4	2, 3
adrenal gland	X	X	X	
aorta (thoracic)	X		X	
bone (sternum, left femur)	X		X	
bone marrow (rib) ^b	X			
brain (medulla/pons, cerebrum and cerebellum)	X	X	X	
epididymides	X	X	X	
esophagus	X		X	
eye	X			
heart	X	X	X	
kidneys	X	X	X	
large intestine (cecum, colon, and rectum)	X		X	
lacrimal gland	X			
larynx ^c	X		X	
liver	X	X	X	
lungs (with mainstem bronchi)	X	X	X	X
lymph node (mediastinal and mesenteric)	X		X	
mammary gland	X			
muscle (biceps femoris)	X			
nasopharyngeal tissue ^d	X		X	
nerve (sciatic)	X		X	
optic nerve	X			
ovaries	X	X	X	
pancreas	X		X	
pituitary	X	X		
prostate	X	X	X	
salivary gland with submandibular lymph node	X		X	
seminal vesicles	X	X	X	
skin	X			
small intestine (duodenum, jejunum, ileum)	X		X	
spinal cord (cervical, thoracic, lumbar)	X		X	
spleen	X	X	X	
stomach	X		X	
testes	X	X	X	
thymic region	X	X	X	

Tissue ^a	Preserved	Weighed	Microscopic Examination (Groups)	
			1, 4	2, 3
thyroid (with parathyroids)	X	X	X	
trachea	X		X	
uninary bladder	X		X	
uterus (body/horns with cervix)	X		X	
Zymbal's gland	X	X		
gross lesions	X		X	X
target organs ^c	X			

^aThese tissues would also have been examined for any animals in Groups 2 and 3 had they died prior to study termination.

^bQualitative examination (no differential count). Bone marrow smears were prepared and archived. They will only be evaluated (sponsor approval) if needed.

^cThe laryngeal mucosa was examined. Sections of the larynx examined included the epithelium covering the base of the epiglottis, the ventral pouch and the medial surfaces of the vocal processes of the arytenoid cartilages.

^dFour sections of the nasopharyngeal tissue were examined. This included sections through the nasal cavity and examinations of the squamous, transitional, respiratory and olfactory epithelia.

^eTarget organs (none have been indentified) will be designated by the study director, pathologist and/or sponsor based on experimental finding.

Preservatives

All tissues - 10% neutral buffered formalin.

Eyes and testes were initially placed in Modified Davidson's solution and then retained in 10% formalin. Lungs and urinary bladder were infused with formalin prior to their immersion into a larger volume of the same fixative.

Smear preparations of the marrow from the rib were air dried and fixed in absolute methanol.

Processing

After fixation, the tissues and organs from all animals were routinely processed, embedded in paraffin, cut at a microtome setting of 4 to 7 microns, mounted on glass slides, stained with hematoxylin and eosin and examined by light microscopy. The bones were decalcified in Decalcifier II™.

Larynx sections were prepared from two sites; one was the area of the ventral diverticulum and the other was the area of the ventral seromucous glands at the base of the epiglottis. In a few instances, sections of larynx were not from the aforementioned planes of section. These were classified simply as 'larynx' for the purposes of data entry.

Examination of Testes

Histopathological examination of the designated testes were conducted to identify potential treatment-related effects such as retained spermatids, missing germ cell layers or types, multinucleated giant cells, or sloughing of spermatogenic cells into the lumen. The examination of the intact epididymis was of a longitudinal section permitting examination of the caput, corpus and cauda regions. These examinations could identify such lesions as sperm granulomas, leukocytic infiltration (inflammation), aberrant cell types within the lumen, or the absence of clear cells in the cauda epididymal epithelium.

Evaluation (initial and repeated) of the Groups 1 and 4 sperm morphology revealed an increase in the incidence of 'mid-tail blob' (cytoplasmic droplet) in the Group 4 animals, a finding that suggests a delay in maturation of the sperm. Therefore, hematoxylin and eosin stained sections of testes for the Groups 1-4 males were used to conduct a stage aware qualitative examination of spermatogenesis. The examination was conducted to identify changes such as spermatid retention, stage specific germ cell degeneration, and the presence or absence of germ cells in inappropriate stages of the cycle in accordance with the recommendations of the Society of Toxicologic Pathology (Lanning LL, Creasy DM, Chapin RE, Mann PC, Barlow NJ, Regan KS and Goodman DG. 2002 Recommended approaches for the evaluation of testicular and epididymal toxicity. *Toxicol Pathol* 30: 518-531). The evaluation was performed by Dianne Creasy, Ph.D, Dip RCPATH (tox), FRCPath who has specific expertise in staging. Additional evaluations of Groups 1 and 4 were also performed by HLS UK. Any abnormalities were recorded in the Xybion Data Capture system and the results of the examination were specifically mentioned in the microscopic pathology section of the study report.

Examination of Ovaries

Histopathological examination of the ovary included evaluation of five sections taken at least 100 µm apart from the inner third of each ovary. These examinations could detect depletion of the primordial follicle population and enumerate the total number of

primordial follicles for comparison with the ovaries from control animals. These examinations could also confirm the presence or absence of growing follicles and corpora lutea, in comparison to the control ovaries.

2.20. SPERM COUNT, MOTILITY AND MORPHOLOGY ASSESSMENTS

All of the sperm count and motility assessments were done at the testing facility using a Hamilton Thorne IVOS Sperm Analyzer. Sperm morphology was evaluated manually at HLS UK.

All main study males euthanized at termination in each group were examined for the following sperm evaluations: 1) motility; 2) a count of homogenization-resistant testicular sperm; 3) a count of caudal epididymal sperm; and 4) sperm morphology (cauda epididymis). Evaluations were performed as follows:

- The right testis from each animal was removed intact, weighed (right and left testes weighed together and separately) and preserved in modified Davidson's solution for at least 24 hrs prior to permanent storage in neutral buffered formalin for histopathological evaluation. The right epididymis from each animal was removed intact, weighed (right and left epididymides weighed together and separately) and preserved in neutral buffered formalin for histopathological evaluation.
- If a macroscopic abnormality was noted on the left testis or left epididymis, then the right testis and right epididymis were evaluated and the left testis and left epididymis was preserved as indicated for possible histopathology.
- The left epididymis was removed intact and the caudal portion removed and weighed; the remainder of the tissue was discarded. The caudal portion of the epididymides was stored frozen at -70° C until evaluation for caudal sperm count. Each caudal portion of the epididymis was thawed and a homogenized sample of the caudal epididymis was stained ('Ident' for chromatin in the sperm heads) and examined using the Hamilton Thorne IVOS sperm analyzer. For each stained preparation, 10 fields were counted. The total number of sperm in the caudal epididymis was calculated and adjusted for the caudal epididymal weight.

- The left vas deferens were excised and placed in a prewarmed solution of Medium 199 and 1% Bovine Serum Albumin. After a “swimout” period, a sample was placed into a Hamilton Thorne IVOS sperm analyzer. At least five fields (200 sperm) were recorded and stored as digital video images. These images were analyzed for percent motility and transferred to optical media for permanent storage.
- Additionally, for each male, two sperm morphology slides were prepared from fixed (10% NBF) vas deferens samples (Medium 199/BSA), stained with eosin and nigrosine and evaluated for morphological development (sample aliquots were shipped to HLS UK: Claire Bowden = principal investigator). The Subcontractor was responsible for the QA inspection and audit of the conduct and reporting of the evaluations phase according to their own procedures. The testing facility's quality assurance department acted as lead QA to ensure that there is adequate quality assurance inspection coverage at the test site throughout the study.
- The left testis was removed and frozen on dry ice. The testes were stored frozen at -70°C until processed for counting of homogenization-resistant spermatids. A homogenized sample of the thawed testis was stained (Ident) and examined using the Hamilton Thorne IVOS sperm analyzer. For each stained preparation, 10 fields were counted. The total number of spermatids in the testis was calculated and adjusted for testis weight.
- The homogenized testis samples were discarded following analysis due to limited viability and other specimens will be discarded following issuance of the final report after consultation with sponsor.

2.21. NEUROPATHOLOGY SACRIFICE

Animals (5/sex/group) were anesthetized with an intraperitoneal injection (~1.0 mL/kg) of 26% sodium pentobarbital and transcardially perfused with phosphate buffered saline followed by 2% glutaraldehyde and 2% paraformaldehyde in the same buffer. After perfusion, the required tissues were dissected out. The carcass was placed in the same fixative as above for approximately 24 hours, followed by 10% NBF prior to dissection of tissues. Postmortem examination was limited to the tissues designated for microscopic evaluation. Measurement of the size (length and width) and weight of the whole brain (cerebrum, cerebellum and pons-medulla) were made. All tissues were then placed in a fresh solution of the same fixative prior to processing. Tissues listed in Table II (page 41)

were preserved for all designated neuropathology animals (5/sex/group) after 13 weeks of treatment:

Table II

Tissue	Preserved (Groups)	Microscopic Examination (Groups)	
	All	1 and 4	2 and 3
brain (forebrain, central cerebrum, hippocampus, basal ganglia, midbrain, cerebellum, pons and medulla)	X	X	
eye with optic nerve	X	X	
spinal cord (cervical, thoracic, lumbar cross and longitudinal sections)	X	X	
sciatic nerve (cross and longitudinal sections)	X	X	
tibial nerve (cross and longitudinal sections)	X	X	
sural nerve (cross and longitudinal sections)	X	X	
trigeminal ganglia	X	X	
dorsal root ganglia (from C ₃ -C ₆ and L ₄ -L ₆)	X	X	
dorsal root fibers (from C ₃ -C ₆ and L ₄ -L ₆)	X	X	
ventral root fibers (from C ₃ -C ₆ and L ₄ -L ₆)	X	X	
lungs and trachea	X	X	X
tissues with macroscopic findings	X	X	X

Peripheral nerves were post-fixed in 1% osmium tetroxide, processed and embedded in epoxy resin and microtomed at approximately 2 microns. Sections were stained with toluidine blue. All other tissues, including the brain, eye with optic nerve, spinal cord, trigeminal ganglia, dorsal root ganglia, dorsal and ventral root fibers, lungs and trachea were processed

by standard techniques, embedded in paraffin, microtomed at approximately 6 microns and stained with hematoxylin and eosin.

The tissues listed above were examined microscopically for all animals as indicated. Tissues with macroscopic lesions were examined in all animals. Any abnormalities not noted during macroscopic postmortem examinations which were seen during histological processing were recorded. Since microscopic findings indicative of an effect of test substance administration were not seen in high-exposure animals, examinations were not performed on these tissues/organs for low- and mid-exposure animals.

2.22. STATISTICAL ANALYSIS

The following parameters were analyzed statistically:

- mean body weight values and body weight changes
- mean feed consumption values (presented as grams of feed/kg of body weight/day)
- mean clinical laboratory values
- mean terminal organ weights, organ/body weight ratios and organ/brain weight ratios
- sperm analysis
- mean motor activity counts
- mean FOB data including forelimb and hindlimb grip strength measurements
- landing foot splay measurements and body temperature (rectal)
- micronucleus counts

2.22.1. METHOD OF ANALYSIS

Mean values of all exposure groups were compared to the mean value for the control group at each time interval. Evaluation of equality of group means was made by the appropriate statistical method, followed by a multiple comparison test if needed. Bartlett's test (Bartlett, 1937; Sokal and Rohlf, 1995; Snedecor and Cochran, 1967) was performed to determine if groups had equal variances. For all parameters except organ weights, if the variances were equal, parametric procedures were used; if not, nonparametric procedures were used. Organ weight data were analyzed only by parametric methods. The parametric method was

the standard one-way analysis of variance (ANOVA) using the F ratio to assess significance (Armitage, 1971; Dunlap and Duffy, 1975). If significant differences among the means were indicated, additional tests were used to determine which means were significantly different from the control: Dunnett's (Dunlap et al., 1981; Dunnett, 1955, 1964), Williams (Williams, 1971, 1972), or Cochran and Cox's modified t-test (Cochran and Cox, 1959). The nonparametric method was the Kruskal-Wallis test (Kruskal and Wallis, 1952, 1953) and if differences were indicated, Shirley's test (Shirley, 1977), Steel's test (Steel, 1959) or Pairwise Comparison with Bonferroni Correction (Games and Howell, 1976) was used to determine which means differ from control. Bartlett's test for equality of variance was conducted at the 1% significance level; all other statistical tests were conducted at the 5% and 1% significance levels.

2.22.2. MOTOR ACTIVITY AND FUNCTIONAL OBSERVATIONAL BATTERY (FOB) DATA

All analyses included sex as an independent variable. Since there were not significant effects of sex, separate analyses by sex were not done to explain the nature of the effect. The analyses were performed by Graham Healey, M.Sc. of Huntingdon Life Sciences, Cambridgeshire, England. The testing facility was responsible for the subcontractor's GLP compliance. After submission of the final report, all of the records of the subcontractor were shipped to the testing facility to be archived.

Motor activity

Repeated measures mixed modelling (using Proc Mixed in SAS) was applied to the motor activity data. The model proposed in the protocol included fixed terms for sex, group and their interaction, random animal, fixed period with AR(1) correlation and (five-minute) interval with unstructured correlation (Galecki 1994). However the input dataset contained over 4000 observations and the program would not run in a reasonable timescale. Hence the model was simplified by removing the interval term and analyzing the mean over the 12 intervals. This is only a minor modification since even in the original model comparisons between sexes, groups and periods would all be based on (weighted) means over

the intervals. If the group term in the analysis was significant at the 5% level, then each treatment group was compared with the control using Dunnett's test (Dunnett 1955, 1964). The residuals were checked using the Kolmogorov-Smirnov test (Stephens 1974). If the test was significant at the 1% level, a Blom-transformation (SAS Institute 1999) was considered.

Continuous FOB parameters

Repeated measures mixed modelling (using Proc Mixed in SAS) was applied to the continuous FOB parameters. The model included fixed terms for sex, group and their interaction, random animal, fixed period with AR(1) correlation, the group-by-period interaction, with pre-dose as covariate. The residuals were checked using the Kolmogorov-Smirnov test (Stephens 1974). If the test was significant at the 1% level, a Blom-transformation (SAS Institute 1999) was considered. If the group term in the analysis was significant at the 5% level, then each treatment group was compared with the control using Dunnett's test (Dunnett 1955, 1964). If either of the interactions were strongly significant, then further tests were performed using the SLICE option in Proc Mixed.

Discrete FOB parameters

Repeated measures mixed modelling (using Proc Genmod in SAS), with multinomial distribution and cumulative logit link (Agresti 1989) was used for the discrete FOB parameters. The model included fixed terms for sex, group, random animal, fixed period and pre-dose as covariate. If the dose group effect in the model was statistically significant, each dose group was compared with the control group using pairwise contrasts. Many of the parameters had an insufficient number of non-normal findings to allow this analysis to be carried out.

2.22.3. MICRONUCLEUS ANALYSIS

The results obtained for each treatment group was compared with the results obtained for the concurrent air control group using non-parametric statistical methods. As there was no substantial difference (subjective evaluation by principal investigator) in response between sexes, results for the two sexes were also combined to facilitate interpretation and maximize the power of

statistical analysis. For incidences of micronucleated immature erythrocytes, exact one-sided p-values were calculated by permutation (StatXact, CYTEL Software Corporation, NC, USA). Comparison of several dose levels was made with the concurrent control using the Linear by Linear Association test for trend in a step-down fashion if significance is detected (Agresti et al. 1990); for individual inter-group comparisons (e.g. the positive control group) this procedure simplifies to a straightforward permutation test (Gibbons 1985). For assessment of effects on the proportion of immature erythrocytes, equivalent permutation tests based on rank scores were used, i.e., exact versions of Wilcoxon's sum of ranks test and Jonckheere's test for trend.

2.23. DATA STORAGE

All raw data, preserved specimens, and retained samples, as well as the original study protocol and the original final report are to be maintained in the archives of the testing facility (including all of the above generated by the subcontractors) upon completion of the study. The sponsor will determine the final disposition of these materials.

2.24. REGULATORY REFERENCES

2.24.1. TEST GUIDELINES

This study was designed to meet or exceed the pertinent requirements of:

OECD Guidelines for Testing of Chemicals 413, Adopted 12 May 1981, Subchronic Inhalation Toxicity: 90 Day Study.

US EPA OPPTS Health Effects Test Guidelines 870.3465, 90-Day Inhalation Toxicity, August 1998.

OECD Guidelines for Testing of Chemicals 474, Adopted 21 July 1997, Mammalian Erythrocyte Micronucleus Test, August 1998.

US EPA OPPTS Health Effects Test Guidelines 870.5395, Mammalian Erythrocyte Micronucleus Test, August 1998.

2.24.2. GOOD LABORATORY PRACTICES

This study was conducted in compliance with Organization for Economic Cooperation and Development (OECD) Good Laboratory Practices as set forth in ENV/MC/CHEM(98)17 and EPA Good Laboratory Practices as set forth in 40 CFR Part 792 (TSCA). The micronucleus evaluation was also conducted in compliance with the UK Good Laboratory Practice Regulations (Statutory Instrument 1999 No. 3106, as amended by Statutory Instrument 2004 No. 994). The statistical analysis of the neurobehavioral data was only conducted in compliance with principles of Good Laboratory Practice Standards as set forth in: The UK Good Laboratory Practice Regulations (Statutory Instrument 1999 No 3106 as amended by Statutory Instrument 2004 No. 994). OECD Principles of Good Laboratory Practice (as revised in 1997), ENV/MC/CHEM(98)17. EC Commission Directive 2004/10/EC of 11 February 2004 (Official Journal No L 50/44).

2.24.3. ANIMAL WELFARE ACT COMPLIANCE

This study complied with all appropriate parts of the Animal Welfare Act Regulations: 9 CFR Parts 1 and 2 Final Rules, Federal Register, Volume 54, No. 168, August 31, 1989, pp. 36112-36163, effective October 30, 1989 and 9 CFR Part 3 Animal Welfare Standards; Final Rule, Federal Register, Volume 56, No. 32, February 15, 1991, pp. 6426-6505, effective March 18, 1991.

2.25. PROTOCOL DEVIATIONS

The following protocol deviations occurred during the study but were not considered to have compromised the validity or integrity of the study:

1. During the in-chamber observation on exposure day 63 for group 4 animals, an observation of labored breathing was noted for a few (less than 20%) of the animals. Due to technician oversight, the time of onset and duration was not recorded.
2. Due to technician oversight, body weights for groups 1 to 4 animals (1324, 1325 1823, 1824, 1825, 2323, 2324, 2325, 2824, 2825, 3324,

3325, 3823, 3824, 3825, 4323, 4324, 4325, 4824 and 4825) were not taken for the functional observational battery on test day 89.

3. Due to technician oversight, a bone marrow slide from the rib was not prepared for animal nos. 4314 and 4812.
4. On 20 July 05 (test day 91), the test facility experienced an unexpected power failure in the late afternoon. The necropsy department continued with the sacrifice while the data systems were being maintained by the back-up generator. However, when the back-up generator also failed (a non-routine equipment failure) about 30 minutes later, the following data was no longer able to be collected or was not retrievable from the system:

Gross observations/Tissues collection:

- Animal No. 2814, 2812, 3315 & 4315

Organ weights:

- Animal Nos. 2315 & 3315 – Adrenals, Brain, Heart, Kidneys, Liver, Lungs, Pituitary, Prostate, Seminal Vesicles, Spleen, Thymus
 - Animal No. 4315 – Brain, Heart, Kidneys, Liver, Lungs, Pituitary, Prostate, Seminal Vesicles, Spleen, Thymus
 - Animal Nos. 2814 & 3815 – Adrenals, Brain, Heart, Kidneys, Liver, Lungs, Pituitary, Spleen, Thymus, Ovaries, Uterus
5. Due to technician oversight, the viability check was only performed once (at 1315 on study day 92) instead of twice as required by the protocol. All animals were within normal limits.
 6. Due to computer limitations, the statistical program for the motor activity and FOB evaluations was simplified with minimal effects on the main comparisons.
 7. Due to technician oversight, animal no. 1312 had only 4 fields, not 5 fields as per protocol, selected for sperm motility analysis but did have a total of 249 sperm evaluated.
 8. For the genotoxicity evaluations, the right femurs were removed and sampled, rather than just being fixed as originally outlined in the protocol.

9. For sperm count and motility and morphology evaluations, the left vas deferens was excised and placed in a pre-warmed solution of Medium 199 rather than phosphate buffered saline as originally outlined in the protocol.
10. For the neuropathology sacrifice, animals were anesthetized with an approximately 1.0 mL/kg intraperitoneal injection of 26% sodium pentobarbital rather than a 1.5 mL/kg injection, and then were transcardially perfused with phosphate buffered saline followed by 2% glutaraldehyde and 2% paraformaldehyde in the same buffer. Originally, the glutaraldehyde was to be a 1% solution and the paraformaldehyde a 4% solution.
11. A memo in the study file indicates that the homogenized testis samples for sperm count were discarded on 19 Oct 2005. The original protocol specified that all samples from sperm evaluations were to be retained then discarded following issuance of the final report. The retention requirement for the homogenized samples was changed in Protocol Amendment 1 to be discarded following analysis and storing of digital images, but this amendment was not signed until several months after the fact (14 Feb 2006). There is no correspondence that consultation with the sponsor prior to discarding the homogenized samples was done. The disposal of the tissues prior to the date that the protocol was amended is a protocol deviation.
12. For all animals, the stained preparations of caudal epididymis and testis had 10 fields counted due to focus issues within the analyzer rather than 20 fields.
13. Protocol Amendment No. 4 required that the evaluation (stage aware qualitative examination of spermatogenesis) would be performed and completed by 31 Aug 06 and would be reported (audited) by 15 Sep 06. However, the evaluation was not completed until 18 Sep 06 and was not audited prior to reporting on that same day.

3. RESULTS AND DISCUSSION

3.1. CHAMBER MONITORING

(Appendices A, R & S)

Pre-study chamber distribution analyses (see Appendix R) showed that the test substance was evenly distributed within each chamber. Chamber monitoring (see Appendix S) showed that the chamber oxygen levels were at least 19%. Chamber room monitoring (see Appendix S) showed that no test substance was present in the room and that the sound and light levels were acceptable.

The target and mean ($\pm$ standard deviation) analytical (IR) and nominal concentrations (see Appendix A) are summarized as follows:

Group	Test Substance	Target Concentration (ppm)	Analytical Concentration (ppm)	Nominal Concentration (ppm)
1	Air control	0	0.00 ± 0.00	0 ± 0
2	Liquified Petroleum Gas	1000	1019 ± 58	1098 ± 62
3	Liquified Petroleum Gas	5000	5009 ± 174	5142 ± 99
4	Liquified Petroleum Gas	10000	9996 ± 261	9995 ± 28

The analytically measured (IR) exposure levels of the airborne test substance were acceptably close, in the opinion of the study director, to the targeted exposure levels and to the nominal concentrations (based on weight of test substance consumed). Chamber environmental conditions averaged 25°C temperature and 47% relative humidity.

Mean particle size distribution measurements for the exposures (see Appendix A) are summarized as follows:

Group	Test Substance	Mass Median Aerodynamic Diameter (μm)	Geometric Standard Deviation	Total Mass Concentration (mg/m^3)
1	Air control	3.740	2.177	6.73E-03
2	Liquified Petroleum Gas	2.785	2.242	7.31E-03
3	Liquified Petroleum Gas	2.581	2.215	7.82E-03
4	Liquified Petroleum Gas	2.166	2.070	7.83E-03

These results indicated that the atmospheres were essentially gas/vapor only, as expected, since there was no substantial difference in particle concentration between the test substance chambers and the air control chamber.

Analysis of the major components in the neat test substance and the test atmospheres (see Appendix U) showed an acceptably close comparison between the neat test substance and the vaporized test substance. These data demonstrated that the test animals were exposed, as expected, to all of the major components of the test substance in their acceptably proper proportions. The data were consistent pretest and during the study indicating stability of the test substance and the atmosphere generation techniques.

3.2. MORTALITY (Appendix T)

All animals survived until the scheduled termination of the study except main study female #4812 which was euthanized on test day 83 because of poor condition and weight loss. From necropsy and histopathological findings (see section 3.12), the loss of this animal was considered the result of accidental trauma, not related to the exposures.

3.3. CLINICAL OBSERVATIONS

3.3.1. EXPOSURE PERIODS

(Table 1)

During the exposure periods, all animals were generally unremarkable.

3.3.2. NON-EXPOSURE PERIODS

(Table 2 & Appendix B)

During the non-exposure periods, all animals were generally unremarkable except for a transient period during the 8th week of exposures where several main study animals in the 10000 ppm exposed group were noted with eye closure. This observation coincided with a transient loss of body weight and decreased feed consumption at this same interval, as discussed below. The cause of these transient differences was not clearly determined but was suspected to have been an otherwise undetected interruption in the water supply to some animal cages. A similar pattern was not noted in the neuropathology animals for this same exposure group despite their being housed and exposed together with the main study animals.

3.4. OPHTHALMOSCOPIC EXAMINATIONS

(Table 3 & Appendix C)

There were no indications of treatment-related ocular disease in the test substance exposed animals.

3.5. BODY WEIGHTS

(Figures 3-6, Tables 4-5 & Appendices D - E)

There were no test substance related differences in absolute body weights or in body weight changes in the test substance exposed animals, compared to the air control animals. However, as noted above (section 3.3.2), a transient difference (decreased weight or decreased weight gain)

was noted during the 8th week of exposures especially in the 10000 ppm exposed group of main study animals.

3.6. FEED CONSUMPTION

(Figure 7-10, Table 6 & Appendix F)

There were no test substance related differences in feed consumption in the test substance exposed animals, compared to the air control animals. However, as noted above (section 3.3.2), a transient difference (decreased feed consumption) was noted during the 8th week of exposures especially in the 10000 ppm exposed group of main study animals.

3.7. ESTROUS CYCLICITY

(Table 7 & Appendix G)

There were no test substance related effects on estrous cyclicity in the test substance exposed animals, compared to the air control animals. However, 3 animals at 0 ppm, 2 animals at 5000 ppm and 1 animal at 10000 ppm were noted with extended diestrus periods indicative of pseudopregnancy.

3.8. NEUROBEHAVIORAL STUDIES

(Tables 8, 9 and 10 & Appendix H and I)

There were no test substance related effects on functional observational battery parameters or on motor activity in the test substance exposed animals, compared to the air control animals. An increase in forelimb grip strength was noted for males only in the 5000 and 10000 ppm exposed groups from week 4 of exposures at 10000 ppm and at week 13 at 5000 ppm. This minor finding, particularly in the absence of any other apparent functional effects, was considered unlikely to represent an adverse effect of exposure.

3.9. CLINICAL PATHOLOGY

3.9.1. HEMATOLOGY

(Table 11, Appendix J)

After 13 weeks of exposures, there were no exposure-related differences in hematology values in test substance exposed animals compared to the air control animals. A few statistically significant decreases in WBC, lymphocyte and monocyte values were noted in all or some test substance exposed groups of female animals but the changes were not in an exposure-level-related pattern and were not similarly seen in the male animals.

3.9.2. COAGULATION

(Table 12, Appendix K)

After 13 weeks of exposures, there were no exposure-related differences in coagulation values in test substance exposed animals compared to the air control animals.

3.9.3. CLINICAL CHEMISTRY

(Table 13, Appendix L)

After 13 weeks of exposures, there were no exposure-related differences in clinical chemistry values in test substance exposed animals compared to the air control animals. A few statistically significant differences in glucose, sodium, potassium and total protein values were noted in all or some test substance exposed groups of animals but were not in an exposure-level-related pattern or the absolute differences were minimal or were only seen in one sex.

3.10. ORGAN WEIGHTS AND BRAIN MEASUREMENTS

(Table 14, Appendix M)

After 13 weeks of exposures, there were no exposure-related differences in organ weights and brain measurements in the test substance exposed animals compared to the air control animals. A few statistically significant differences from control animals were noted such as decreased kidney and

thymus weights in the 5000 ppm exposed animals. However, these were not in a exposure-related pattern and/or the absolute differences were minimal. The brain weights in perfused neuropathology animals were lower in general than those in non-perfused main study animals since the perfusion fixatives desiccate the brain tissue.

3.11. SPERM ANALYSIS DATA

(Table 15, Appendix N)

Among the various parameters of sperm count, motility and morphology that were examined for control and the test substance exposure groups, there was a slight increase in the incidence of 'mid-tail blob' (cytoplasmic droplet), in the 10000 ppm group only, when compared with control, but this was not statistically significant. This finding may reflect relative immaturity of the affected sperm, and the increased incidence (1.8 to 6.8% of the 400 sperm evaluated in each animal) affected 4 of the 10 males examined in the group. The most usual incidence of this finding in control animals of this strain in this laboratory is 0 to 2% in each animal (similar to the concurrent control group in this study), although occasional control animals have shown 6 to 8% incidence.

The increase in 'mid-tail blob' was the primary cause of the statistically significant decrease in % normal sperm in this group. There were no correlative findings in the animals showing these higher incidences of cytoplasmic droplet in the 10000 ppm group, in terms of the other sperm parameters, histological findings, or general condition (body weight, etc). In the absence of correlative findings, it was considered most likely that this difference from control was incidental and not related to exposure.

3.12. PATHOLOGY

3.12.1. MACROSCOPIC – MAIN STUDY ANIMALS

(Table 16, Appendix O)

Unscheduled Decedent

One 10000 ppm exposed female (#4812) was euthanized in moribund condition on study day 83 prior to study termination. Macroscopic findings were limited to a hard, red mass of the ventral skull. This gross lesion correlated microscopically with

evidence of post-fracture healing with an organizing hematoma and developing callus. Presumptive fracture of the skull was considered the likely cause of moribundity in this one animal, and thus the cause of death was considered accidental trauma.

Scheduled Sacrifice

There were no macroscopic changes associated with the exposure to the test substance. All findings occurred similarly in test substance-exposed and air control animals, or sporadically in individual animals. These findings were considered incidental and thus unrelated to test substance exposure.

3.12.2. MICROSCOPIC – MAIN STUDY ANIMALS

(Table 17, Appendix O)

Unscheduled Decedent and Scheduled Sacrifice

No test substance-related changes were observed in test substance-exposed animals. All changes occurred similarly in test substance-exposed and control animals alike or sporadically in individual animals.

Due to possible test substance-related changes that were seen in sperm parameters, the testes of the controls and high exposure group (10000 ppm LPG) were subjected to a detailed qualitative re-examination with special emphasis on the stages of the spermatogenic cycle. This examination confirmed that the appropriate cell types were present in seminiferous tubules in the various stages of the spermatogenic cycle and that there were no morphological abnormalities in the processs of spermiogenesis (spermatid development) or in spermiation (sperm release). On the basis of this stage-aware examination, there were no abnormal changes in spermatogenesis that would correlate with abnormal sperm parameters in the test substance-exposed animals.

3.12.3. NEUROPATHOLOGY ANIMALS**(Tables 16 & 17, Appendix O)**

No test substance-related changes were observed macroscopically or microscopically. All changes occurred similarly in test substance-exposed and control animals alike or sporadically in individual animals.

3.13. GENOTOXICITY EVALUATION**(Appendix Y)**

After 13 weeks of exposures, there were no exposure-related differences in micronucleus incidence in the test substance exposed animals compared to the Air control animals.

4. CONCLUSION

Thirteen weeks of exposure of rats to liquified petroleum gas resulted in no adverse effects of exposure. Therefore, the 10000 ppm exposure level was considered a no observed adverse effect level (NOAEL).

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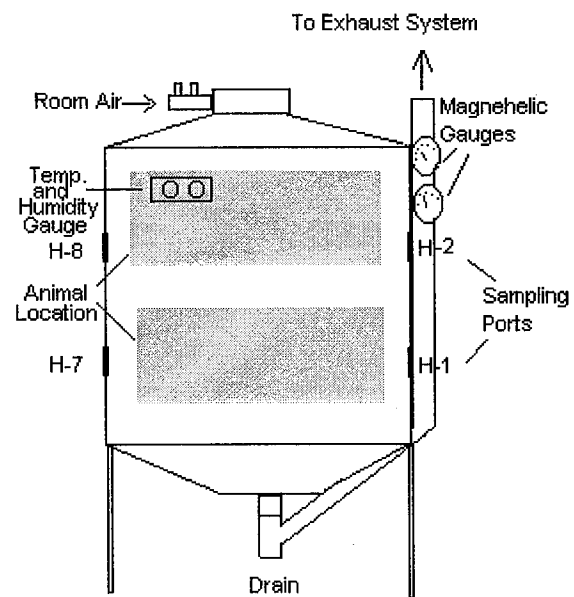
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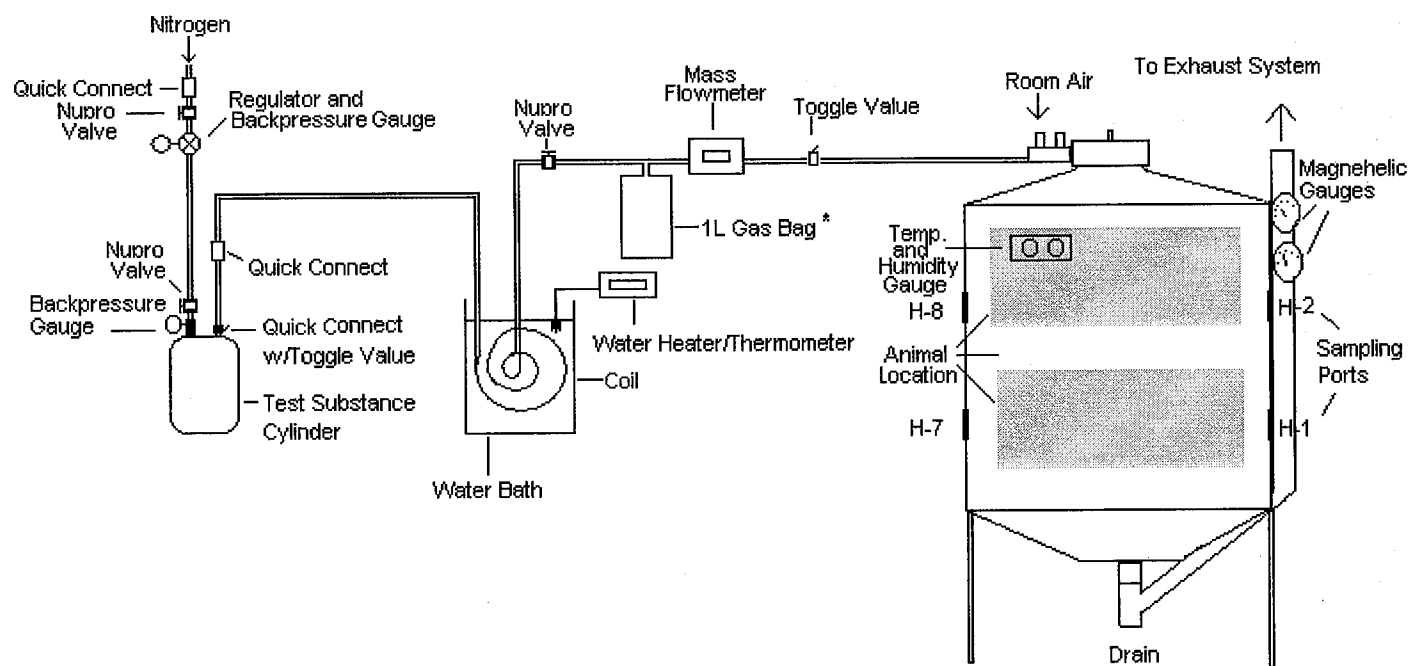
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Group 1	Diagram of 1000-Liter Whole-Body Exposure Chamber and Generation System	Figure 1
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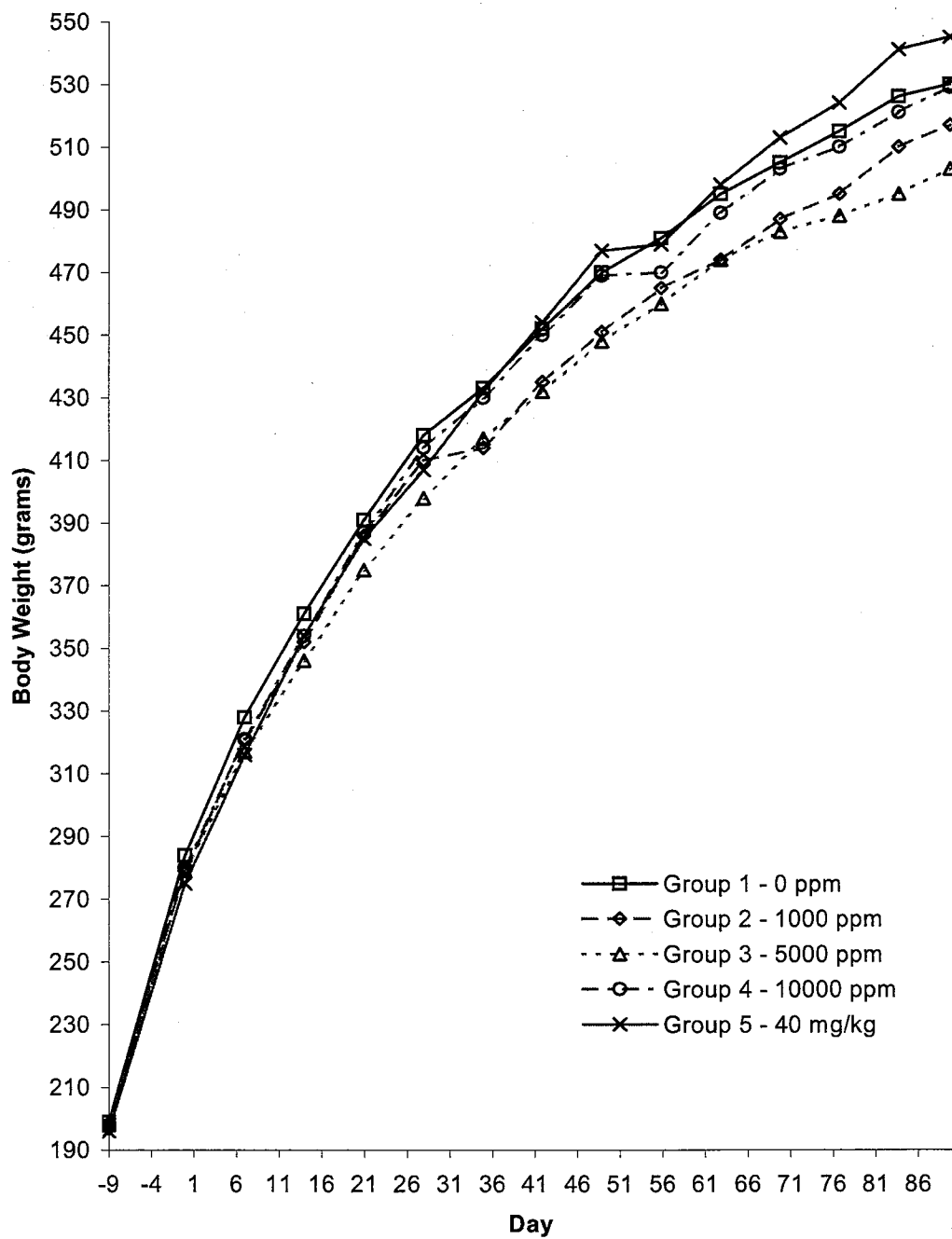


Group 2, 3 & 4	Diagram of 1000 Liter Whole-Body Exposure Chamber and Generation System	Figure 2
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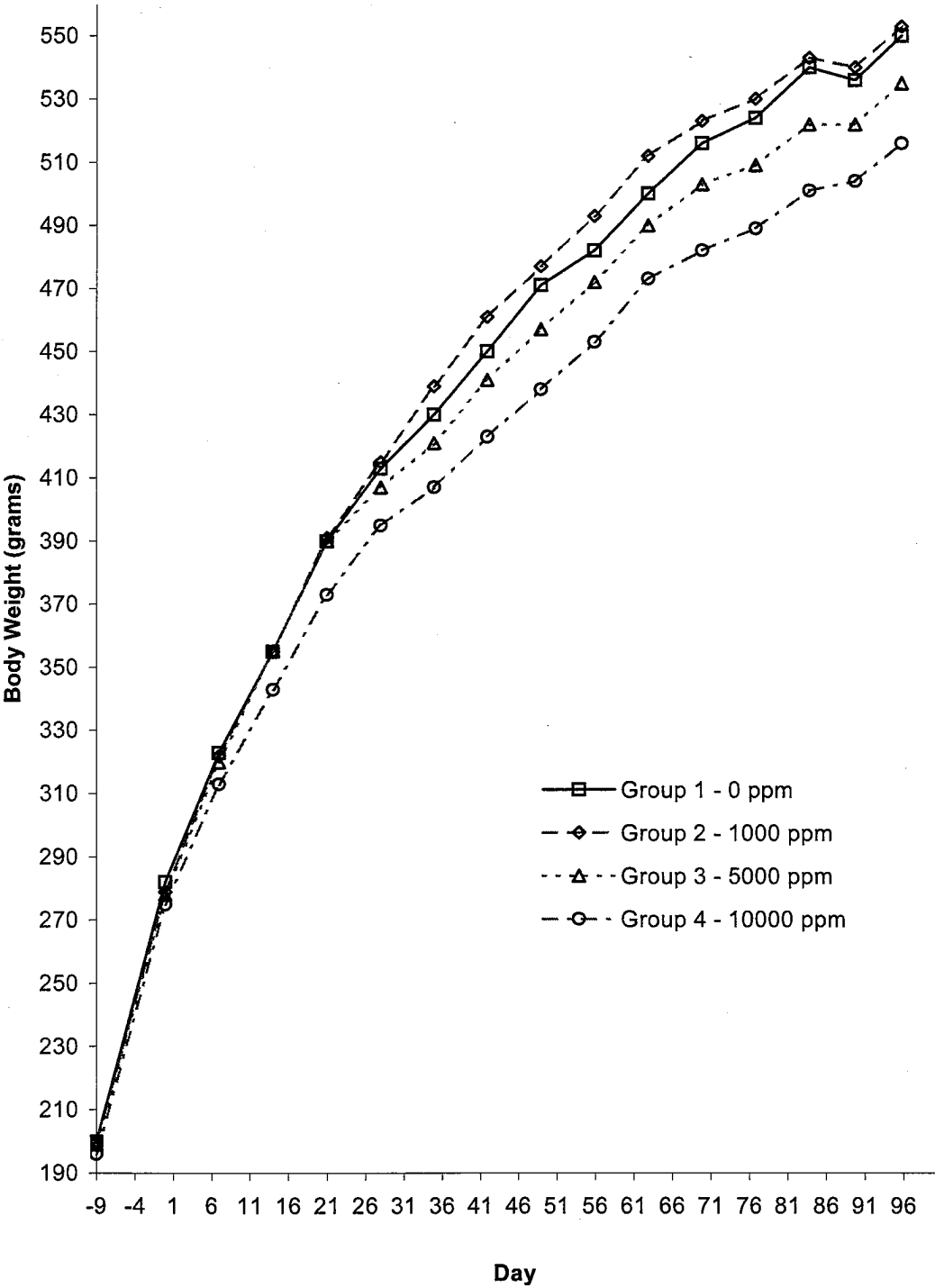


* = Not used for Group 4

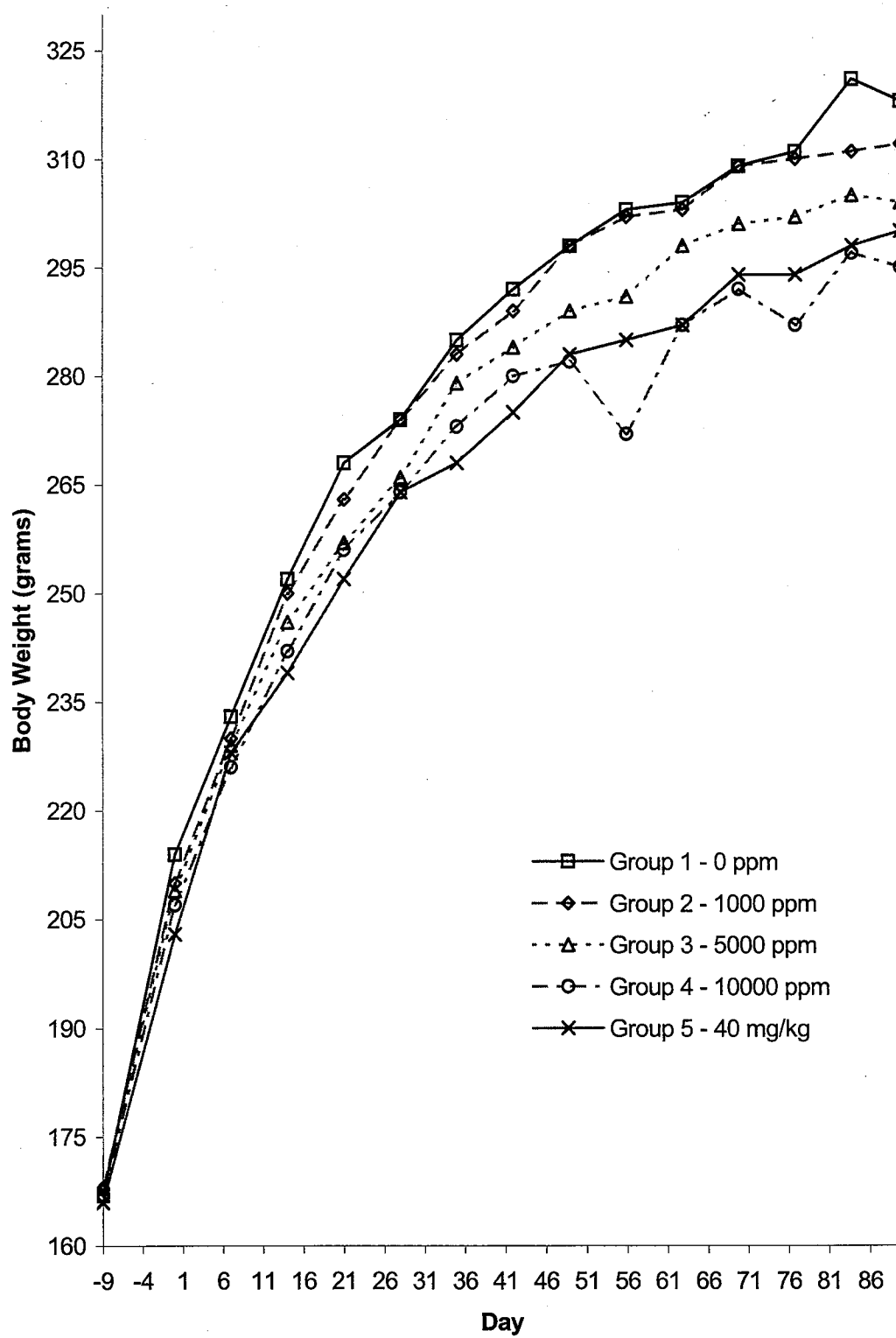
Males	Mean Body Weights (Main Study)	Figure 3
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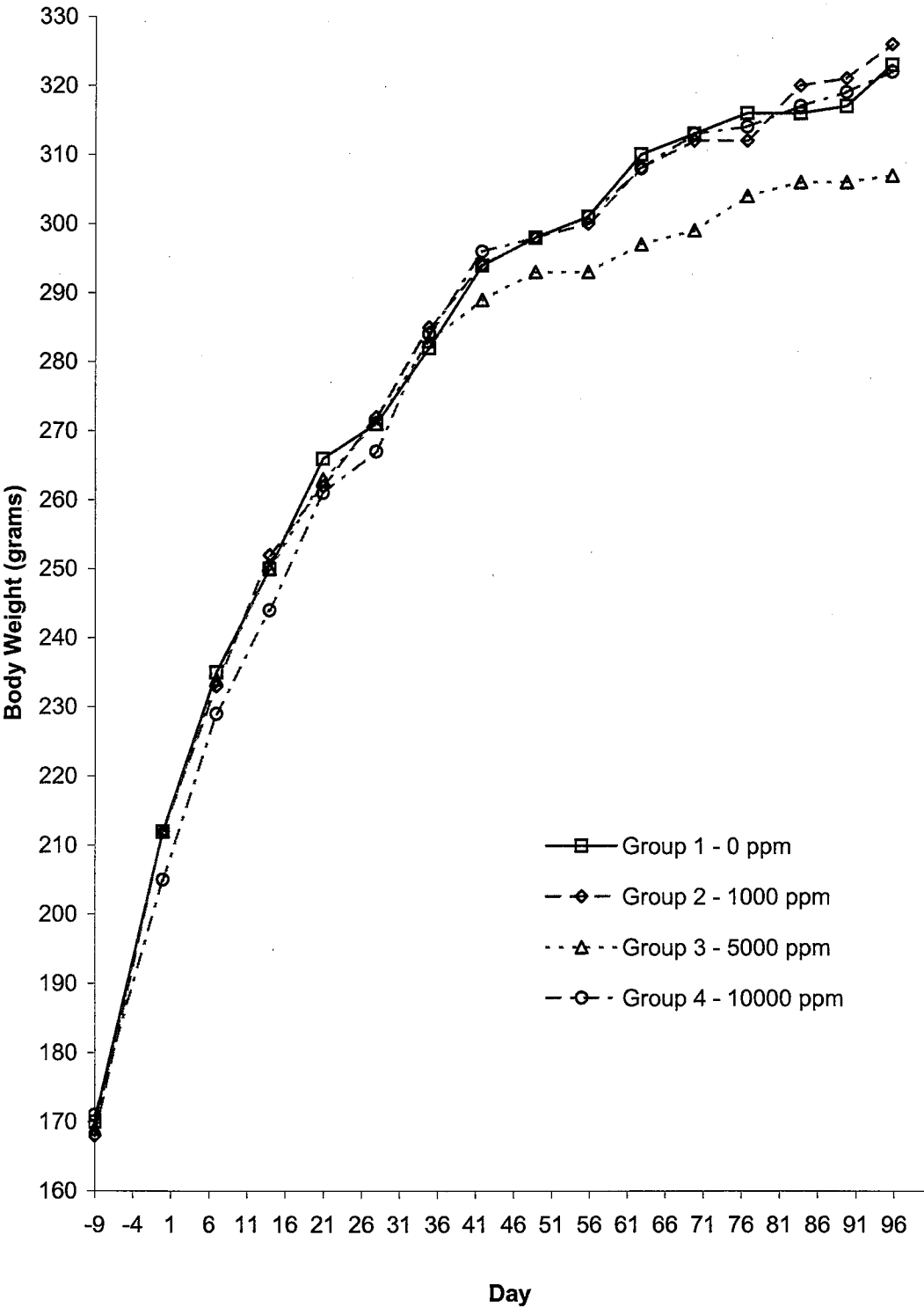
Males	Mean Body Weights (Neurotoxicity)	Figure 4
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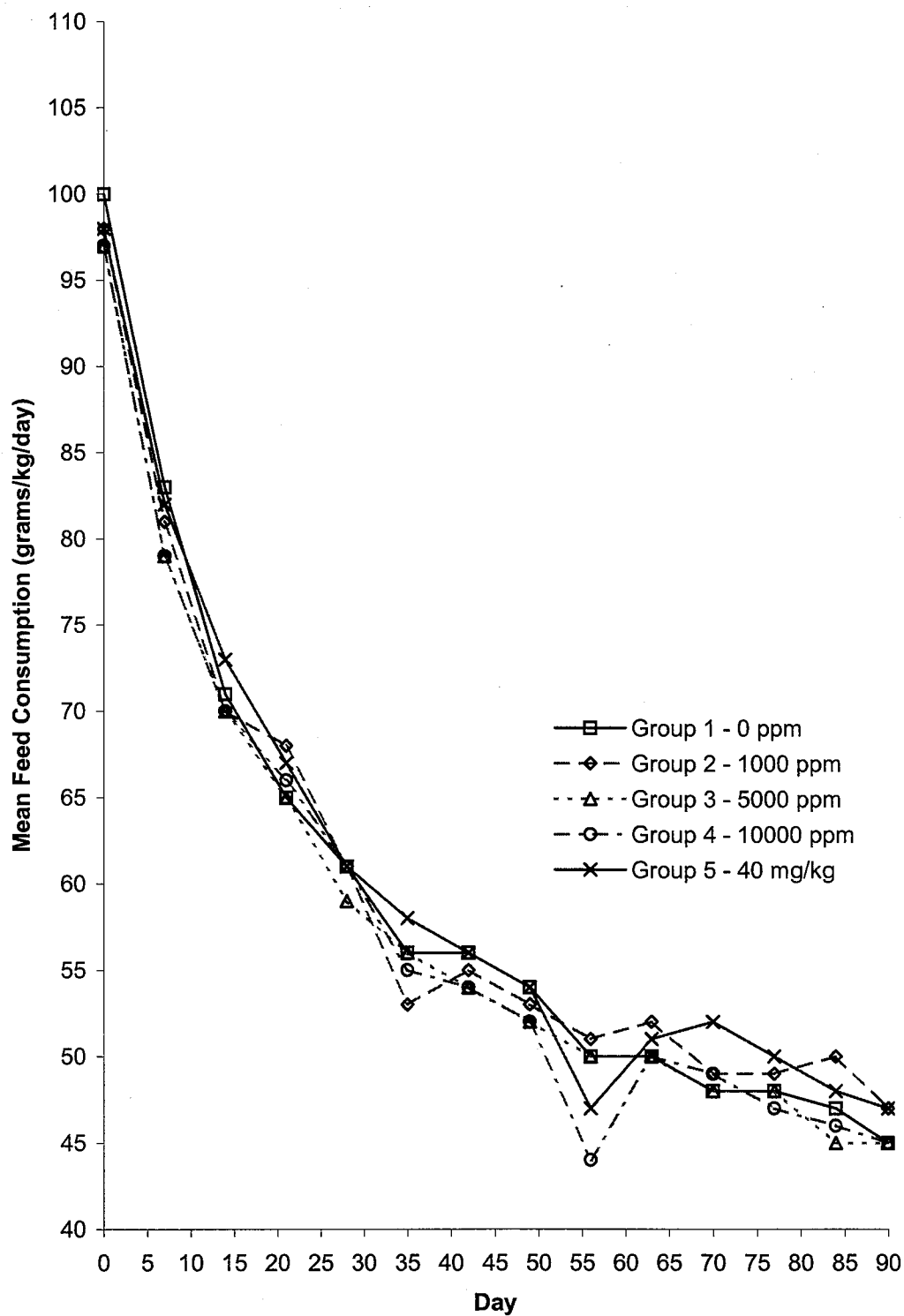
Females	Mean Body Weights (Main Study)	Figure 5
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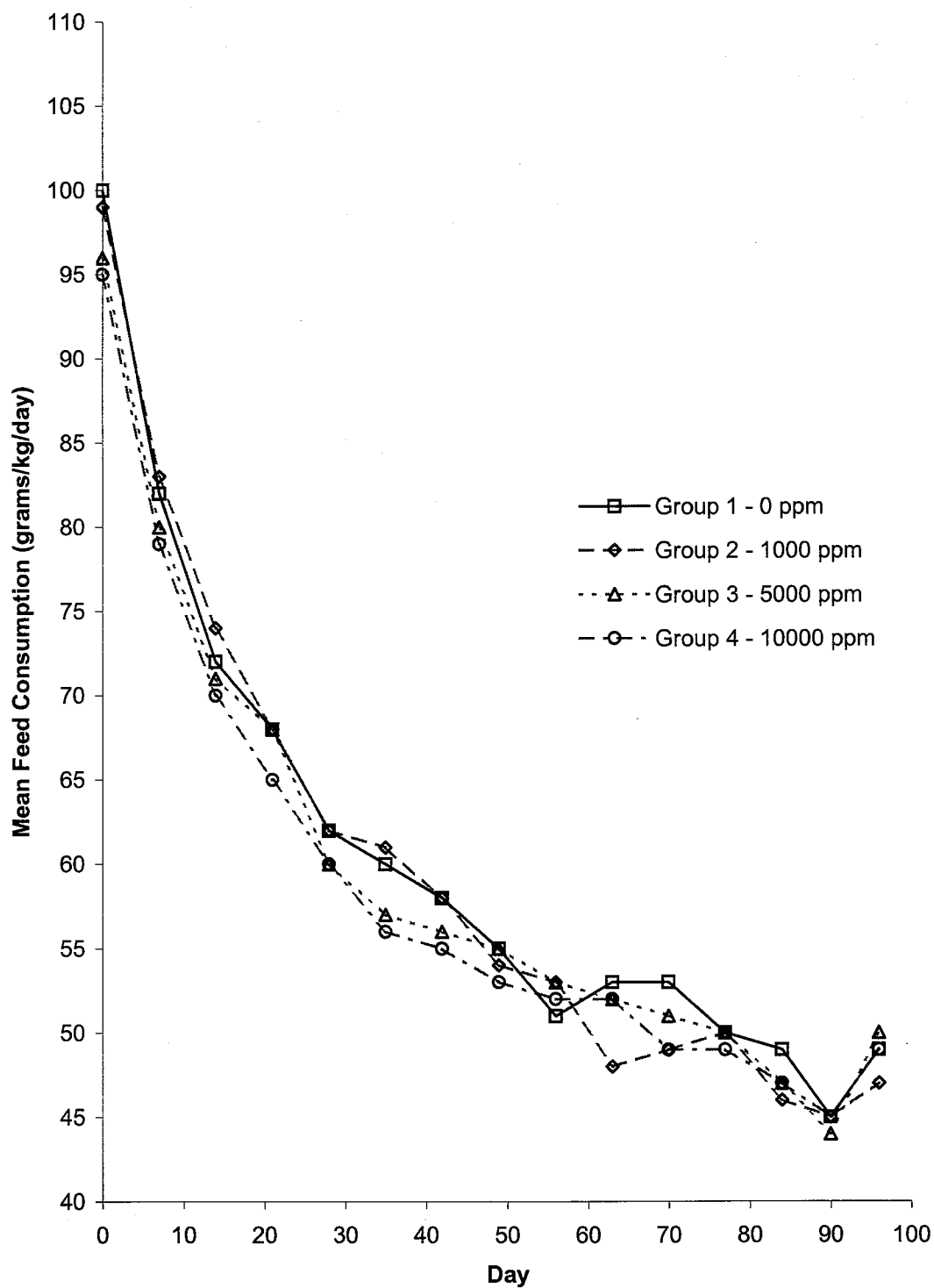
Females	Mean Body Weights (Neurotoxicity)	Figure 6
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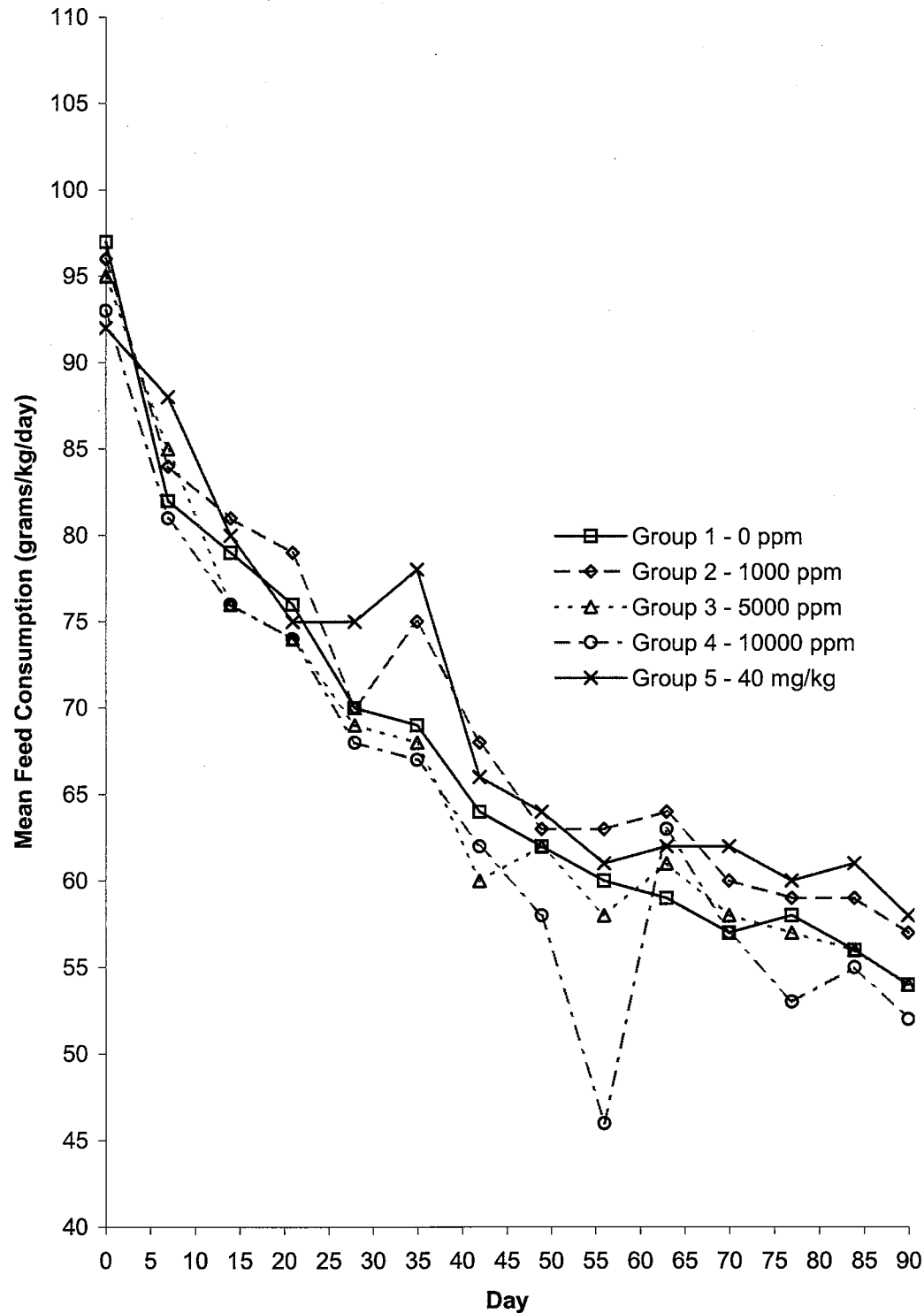
Males	Mean Feed Consumption (Main Study)	Figure 7
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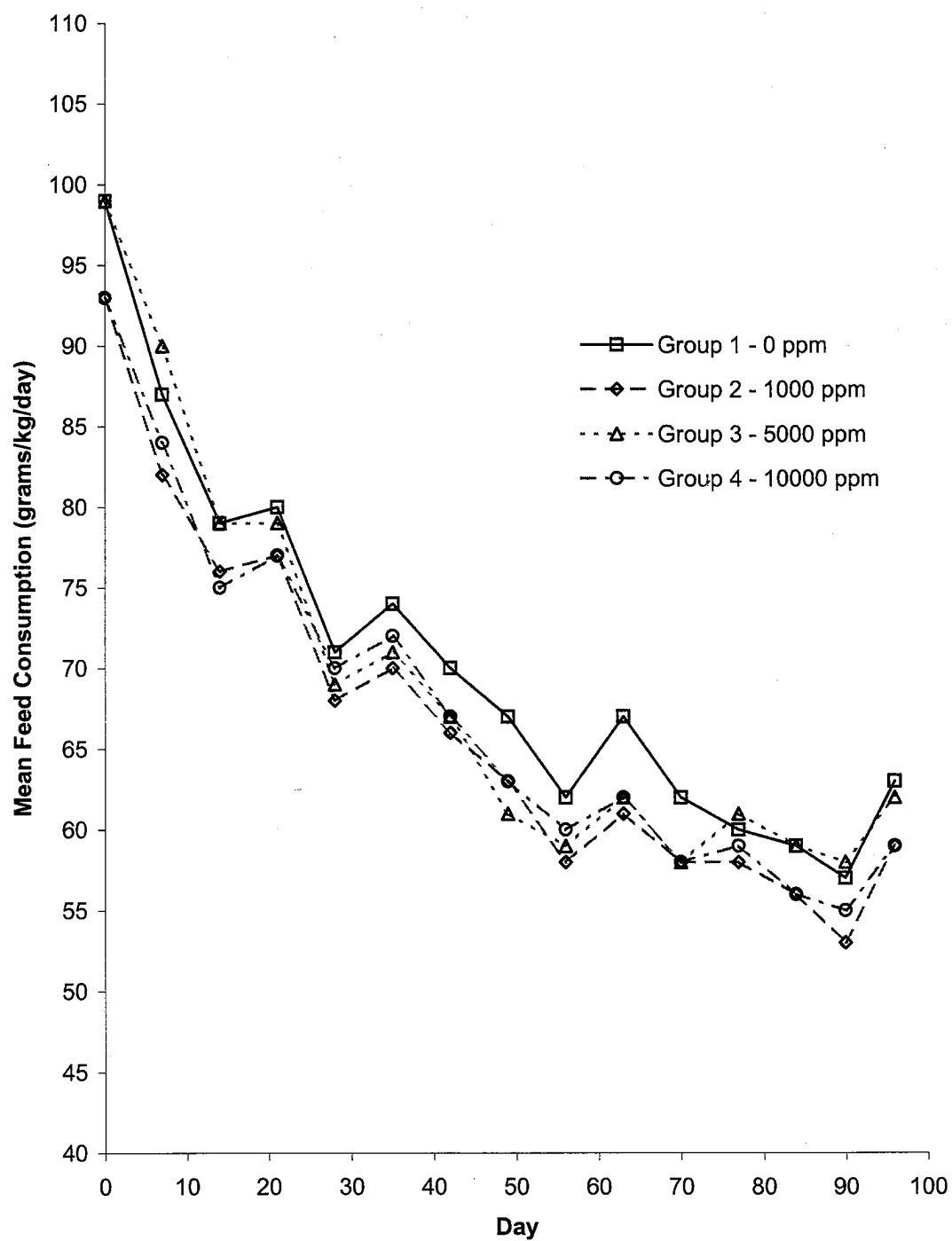
Males	Mean Feed Consumption (Neurotoxicity)	Figure 8
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Females	Mean Feed Consumption (Main Study)	Figure 9
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Females	Mean Feed Consumption (Neurotoxicity)	Figure 10
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	General Preface	
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General Notes

Individual animal data values presented in this report may be rounded. Unrounded individual animal data values are used to calculate the reported mean and standard deviation values. Therefore, use of the reported individual values to reproduce means, standard deviations and/or to perform any subsequent calculations may produce minor discrepancies between the calculated values and those presented in this report.

Key Abbreviations

03-6141 = Main Study Animals
03-6141N = Neurotoxicity Animals

M = Male
F = Female

	Summary of In-Chamber Observations										Table 1				
Exposure Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Group 1 – 0 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 2 – 1000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 3 – 5000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 4 – 10000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All

All = 100% of the animals exhibiting a given observation.

	Summary of In-Chamber Observations											Table 1			
Exposure Day	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Group 1 – 0 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 2 – 1000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 3 – 5000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 4 – 10000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All

All = 100% of the animals exhibiting a given observation.

	Summary of In-Chamber Observations											Table 1			
Exposure Day	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Group 1 – 0 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 2 – 1000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 3 – 5000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 4 – 10000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All

All = 100% of the animals exhibiting a given observation.

	Summary of In-Chamber Observations											Table 1			
Exposure Day	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Group 1 – 0 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 2 – 1000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 3 – 5000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 4 – 10000 ppm															
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All

All = 100% of the animals exhibiting a given observation.

	Summary of In-Chamber Observations											Table 1		
Exposure Day	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Group 1 – 0 ppm														
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 2 – 1000 ppm														
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 3 – 5000 ppm														
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Group 4 – 10000 ppm														
Within Normal Limits	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Labored Breathing			Most	All	All	All	All	All	All	All	All	All	All	All

All = 100% of the animals exhibiting a given observation.
 Most = 51 to 99% of the animals exhibiting a given observation.
 Few = <20% of the animals exhibiting a given observation.

	Summary of Clinical Observations Preface	Table 2
--	---	---------

Number of animals examined represents the total number of animals observed and animals which were killed at a scheduled sacrifice for a given interval.

For summarization purposes, descriptive comments [i.e., location of scab(s) and/or sore(s), etc.] are not presented in this table. These data are contained in the study raw data if needed.

Total represents a cumulative total of all animals with the indicated observation one or more times during the study.

Corresponding exposure levels for each group were as follows:

Group 1	-	0 ppm
Group 2	-	1000 ppm
Group 3	-	5000 ppm
Group 4	-	10000 ppm
Group 5	-	40 mg/kg (genotoxicity positive control)

TABLE 2

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES

SUMMARY OF CLINICAL OBSERVATIONS

[illegible]

MALES

SUMMARY OF CLINICAL OBSERVATIONS

[illegible]

MALES

SUMMARY OF CLINICAL OBSERVATIONS

ORAL/BUCCAL

Incisors Maloccluded	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1
2	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1
3	0	0	0	0	1	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	2
4	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1
5	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1

[illegible]

TABLE 2

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES

SUMMARY OF CLINICAL OBSERVATIONS

[illegible]

FEMALES

SUMMARY OF CLINICAL OBSERVATIONS

[illegible]

TABLE 2

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES

SUMMARY OF CLINICAL OBSERVATIONS

[illegible]

TABLE 2

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES

SUMMARY OF CLINICAL OBSERVATIONS

		DAY OF STUDY			
	GROUP#	-9	97	98	TOTAL

# OF ANIMALS EXAMINED	1	5	3	2	
	2	5	2	3	
	3	5	3	2	
	4	5	2	3	
NORMAL					
WITHIN NORMAL LIMITS	1	5	0	0	5
	2	5	0	0	5
	3	5	0	0	5
	4	5	0	0	5
DEAD					
Terminal Sacrifice	1	0	3	2	5
	2	0	2	3	5
	3	0	3	2	5
	4	0	2	3	5

TABLE 2

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES

SUMMARY OF CLINICAL OBSERVATIONS

	DAY OF STUDY				
GROUP#	-9	97	98	TOTAL	

# OF ANIMALS EXAMINED	1	5	2	3	
	2	5	3	2	
	3	5	2	3	
	4	5	3	2	
NORMAL					
WITHIN NORMAL LIMITS	1	5	0	0	5
	2	5	0	0	5
	3	5	0	0	5
	4	5	0	0	5
DEAD					
Terminal Sacrifice	1	0	2	3	5
	2	0	3	2	5
	3	0	2	3	5
	4	0	3	2	5

	Summary of Ophthalmoscopic Findings	Table 3
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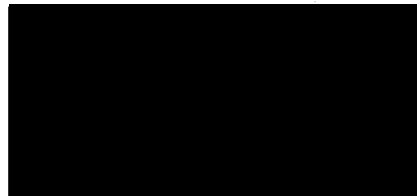
LIONEL F. RUBIN, V.M.D
2020 Walnut St., Apt 31D
Philadelphia PA 19103
(215) 557 0237

April 14, 2005

Huntingdon Life Sciences, Inc.
Mettlers Road, Box 2360
East Millstone, NJ 08875-2360

Re: study 03-6141

Ophthalmoscopic examination of study 03-6141 pretest rats was performed April 14, 2005. Rats with ocular abnormalities were identified and should be withdrawn from inclusion in the study if convenient.



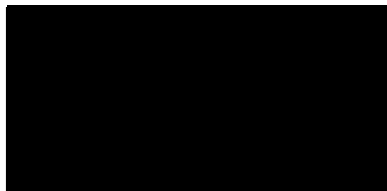
LIONEL F. RUBIN, V.M.D
2020 Walnut St., Apt 31D
Philadelphia PA 19103
(215) 557 0237

April 14, 2005

Huntingdon Life Sciences, Inc.
Mettlers Road, Box 2360
East Millstone, NJ 08875-2360

Re: study 03-6141N

Ophthalmoscopic examination of study 03-6141N pretest rats was performed April 14, 2005. No abnormality was seen. All rats are suitable for inclusion in the study.



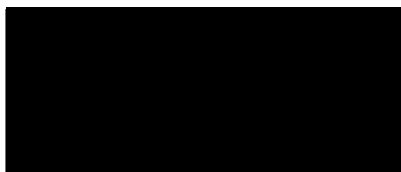
LIONEL F. RUBIN, V.M.D
2020 Walnut St., Apt 31D
Philadelphia PA 19103
(215) 557 0237

July 14, 2005

Huntingdon Life Sciences, Inc.
Mettlers Road, Box 2360
East Millstone, NJ 08875-2360

Re: study 03-6141

Ophthalmoscopic examination of study 03-6141 rats was performed July 13, 2005 (day 84). I have reviewed the findings of the type and incidence of ocular abnormalities. There is no indication of dose or compound related ocular disease. In my opinion, none of the ocular abnormalities is attributable to the administration of the test compound.



LIONEL F. RUBIN, V.M.D
2020 Walnut St., Apt 31D
Philadelphia PA 19103
(215) 557 0237

July 14, 2005

Huntingdon Life Sciences, Inc.
Mettlers Road, Box 2360
East Millstone, NJ 08875-2360

Re: study 03-6141N

Ophthalmoscopic examination of study 03-6141N rats was performed July 13, 2005 (day 84). I have reviewed the findings of the type and incidence of ocular abnormalities. There is no indication of dose or compound related ocular disease. In my opinion, none of the ocular abnormalities is attributable to the administration of the test compound.

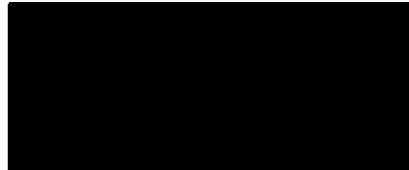


TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS						
					DAY -6	

DOSE GROUP:		1	2	3	4	5
DOSE LEVEL (PPM):		0	1000	5000	10000	40

MALES	total number examined	10	10	10	10	5
NO ABNORMALITIES DETECTED						

TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

		DAY -6				
DOSE GROUP:		1	2	3	4	5
DOSE LEVEL (PPM):		0	1000	5000	10000	40
FEMALES	total number examined	10	10	10	10	5
	NO ABNORMALITIES DETECTED					

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

DAY 84

		1	2	3	4	5
DOSE GROUP:		1	2	3	4	5
DOSE LEVEL (PPM):		0	1000	5000	10000	40
MALES	total number examined	10	10	10	10	5
CORNEA	N	1	0	0	0	0

CORNEAL SCAR	N	1	0	0	0	0
	%	10.0	0.0	0.0	0.0	0.0
CONJUNCTIVA	N	1	1	2	0	1

CONJUNCTIVITIS	N	1	1	2	0	1
	%	10.0	10.0	20.0	0.0	20.0

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TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS						
					DAY 84	

DOSE GROUP:		1	2	3	4	5
DOSE LEVEL (PPM):		0	1000	5000	10000	40

FEMALES	total number examined	10	10	10	9	5
NO ABNORMALITIES DETECTED						

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TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

		DAY -6			
DOSE GROUP:		1	2	3	4
DOSE LEVEL (PPM):		0	1000	5000	10000
MALES	total number examined	5	5	5	5
	NO ABNORMALITIES DETECTED				

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TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

		DAY -6			
DOSE GROUP:		1	2	3	4
DOSE LEVEL (PPM):		0	1000	5000	10000
FEMALES	total number examined	5	5	5	5
	NO ABNORMALITIES DETECTED				

TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

		DAY 84			
DOSE GROUP:		1	2	3	4
DOSE LEVEL (PPM):		0	1000	5000	10000
MALES	total number examined	5	5	5	5
CONJUNCTIVA	N	1	0	0	0
CONJUNCTIVITIS	N	1	0	0	0
	%	20.0	0.0	0.0	0.0

TABLE 3

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

SUMMARY OF OPHTHALMOLOGY OBSERVATIONS

		DAY 84			
DOSE GROUP:		1	2	3	4
DOSE LEVEL (PPM):		0	1000	5000	10000
FEMALES	total number examined	5	5	5	5
CONJUNCTIVA	N	1	0	0	0

CONJUNCTIVITIS	N	1	0	0	0
	%	20.0	0.0	0.0	0.0

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHTS (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY	-9	MEAN	199	197	198	198	196
		S.D.	10.3	8.6	8.0	8.0	7.5
		N	10	10	10	10	5
DAY	0	MEAN	284	279	279	280	275
		S.D.	18.2	14.3	14.0	9.6	23.1
		N	10	10	10	10	5
DAY	7	MEAN	328	321	317	321	316
		S.D.	24.3	23.2	20.0	17.6	36.3
		N	10	10	10	10	5
DAY	14	MEAN	361	352	346	354	354
		S.D.	29.1	30.3	19.8	23.3	45.1
		N	10	10	10	10	5
DAY	21	MEAN	391	386	375	387	385
		S.D.	36.0	36.3	25.8	30.7	48.8
		N	10	10	10	10	5
DAY	28	MEAN	418	410	398	414	407
		S.D.	39.0	39.3	28.0	33.3	50.7
		N	10	10	10	10	5
DAY	35	MEAN	433	414	417	430	432
		S.D.	37.9	39.9	29.0	34.3	56.4
		N	10	10	10	10	5
DAY	42	MEAN	452	435	432	450	454
		S.D.	41.2	45.0	30.0	37.3	59.8
		N	10	10	10	10	5
DAY	49	MEAN	470	451	448	469	477
		S.D.	44.9	48.3	31.5	41.5	61.6
		N	10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHTS (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 56	MEAN		481	465	460	470	479
	S.D.		47.7	50.0	31.2	45.6	61.8
	N		10	10	10	10	5
DAY 63	MEAN		495	474	474	489	498
	S.D.		50.7	52.6	30.6	45.8	66.5
	N		10	10	10	10	5
DAY 70	MEAN		505	487	483	503	513
	S.D.		52.4	54.7	32.0	47.6	65.7
	N		10	10	10	10	5
DAY 77	MEAN		515	495	488	510	524
	S.D.		54.8	54.8	32.1	47.3	70.0
	N		10	10	10	10	5
DAY 84	MEAN		526	510	495	521	541
	S.D.		56.1	57.8	32.0	49.4	68.7
	N		10	10	10	10	5
DAY 90	MEAN		530	517	503	529	545
	S.D.		60.5	62.8	32.7	49.2	69.1
	N		10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHTS (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY	-9	MEAN	167	168	168	167	166
		S.D.	6.3	5.3	6.4	6.6	4.3
		N	10	10	10	10	5
DAY	0	MEAN	214	210	209	207	203
		S.D.	9.0	8.0	17.0	7.9	7.1
		N	10	10	10	10	5
DAY	7	MEAN	233	230	229	226	228
		S.D.	10.1	8.8	17.5	6.9	5.8
		N	10	10	10	10	5
DAY	14	MEAN	252	250	246	242	239
		S.D.	11.8	12.0	18.5	9.3	8.1
		N	10	10	10	10	5
DAY	21	MEAN	268	263	257	256	252
		S.D.	14.0	11.8	26.1	9.7	9.0
		N	10	10	10	10	5
DAY	28	MEAN	274	274	266	264	264
		S.D.	16.7	13.6	26.5	9.5	11.2
		N	10	10	10	10	5
DAY	35	MEAN	285	283	279	273	268
		S.D.	18.2	12.5	29.1	10.1	6.1
		N	10	10	10	10	5
DAY	42	MEAN	292	289	284	280	275
		S.D.	16.9	13.2	30.1	13.6	8.0
		N	10	10	10	10	5
DAY	49	MEAN	298	298	289	282	283
		S.D.	21.4	16.0	30.2	13.2	8.2
		N	10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHTS (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 56	MEAN		303	302	291	272**	285
	S.D.		23.9	18.1	31.0	16.1	7.6
	N		10	10	10	10	5
DAY 63	MEAN		304	303	298	287	287
	S.D.		22.7	16.7	33.8	12.0	8.5
	N		10	10	10	10	5
DAY 70	MEAN		309	309	301	292	294
	S.D.		23.0	18.7	32.2	10.7	7.7
	N		10	10	10	10	5
DAY 77	MEAN		311	310	302	287	294
	S.D.		26.2	18.8	34.0	11.2	5.5
	N		10	10	10	10	5
DAY 84	MEAN		321	311	305	297	298
	S.D.		23.1	20.7	37.0	12.2	6.0
	N		10	10	10	9	5
DAY 90	MEAN		318	312	304	295	300
	S.D.		24.6	19.7	34.8	12.2	8.8
	N		10	10	10	9	5

Statistical key: ** = p<0.01

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHTS (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY	-9	MEAN	200	200	199	196
		S.D.	9.3	8.9	6.8	10.8
		N	5	5	5	5
DAY	0	MEAN	282	279	278	275
		S.D.	14.6	24.2	7.7	16.0
		N	5	5	5	5
DAY	7	MEAN	323	322	320	313
		S.D.	27.4	31.4	15.6	20.5
		N	5	5	5	5
DAY	14	MEAN	355	355	355	343
		S.D.	40.0	42.2	18.0	23.2
		N	5	5	5	5
DAY	21	MEAN	390	391	390	373
		S.D.	48.3	48.6	23.4	29.1
		N	5	5	5	5
DAY	28	MEAN	413	415	407	395
		S.D.	49.7	52.7	23.4	32.8
		N	5	5	5	5
DAY	35	MEAN	430	439	421	407
		S.D.	48.4	58.5	20.9	35.0
		N	5	5	5	5
DAY	42	MEAN	450	461	441	423
		S.D.	53.1	62.0	20.7	39.7
		N	5	5	5	5
DAY	49	MEAN	471	477	457	438
		S.D.	55.7	65.6	20.2	44.3
		N	5	5	5	5

No statistically significant differences

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHTS (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 56	MEAN		482	493	472	453
	S.D.		55.2	68.0	20.3	44.5
	N		5	5	5	5
DAY 63	MEAN		500	512	490	473
	S.D.		65.5	68.0	21.4	47.5
	N		5	5	5	5
DAY 70	MEAN		516	523	503	482
	S.D.		70.8	74.8	21.3	50.2
	N		5	5	5	5
DAY 77	MEAN		524	530	509	489
	S.D.		76.7	77.1	24.5	50.0
	N		5	5	5	5
DAY 84	MEAN		540	543	522	501
	S.D.		81.4	75.5	20.7	52.1
	N		5	5	5	5
DAY 90	MEAN		536	540	522	504
	S.D.		83.8	81.0	23.9	49.9
	N		5	5	5	5
DAY 96	MEAN		550	553	535	516
	S.D.		84.0	83.3	23.1	50.0
	N		5	5	5	5

No statistically significant differences

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHTS (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY	-9	MEAN	170	168	169	171
		S.D.	7.3	8.8	10.6	8.3
		N	5	5	5	5
DAY	0	MEAN	212	212	212	205
		S.D.	12.1	11.6	7.2	11.5
		N	5	5	5	5
DAY	7	MEAN	235	233	234	229
		S.D.	13.8	14.0	10.6	17.4
		N	5	5	5	5
DAY	14	MEAN	250	252	250	244
		S.D.	13.5	14.8	12.3	18.7
		N	5	5	5	5
DAY	21	MEAN	266	262	263	261
		S.D.	20.0	10.8	12.3	14.6
		N	5	5	5	5
DAY	28	MEAN	271	272	271	267
		S.D.	18.8	14.0	6.8	13.7
		N	5	5	5	5
DAY	35	MEAN	282	285	283	284
		S.D.	21.1	17.9	13.3	13.0
		N	5	5	5	5
DAY	42	MEAN	294	294	289	296
		S.D.	23.3	17.5	8.9	11.5
		N	5	5	5	5
DAY	49	MEAN	298	298	293	298
		S.D.	21.8	18.2	7.5	10.1
		N	5	5	5	5

No statistically significant differences

TABLE 4

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHTS (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 56	MEAN		301	300	293	301
	S.D.		29.4	21.8	10.2	9.9
	N		5	5	5	5
DAY 63	MEAN		310	308	297	308
	S.D.		39.5	22.1	12.5	8.0
	N		5	5	5	5
DAY 70	MEAN		313	312	299	313
	S.D.		32.8	20.9	12.6	4.9
	N		5	5	5	5
DAY 77	MEAN		316	312	304	314
	S.D.		34.3	20.7	12.0	3.2
	N		5	5	5	5
DAY 84	MEAN		316	320	306	317
	S.D.		33.1	23.6	13.4	4.6
	N		5	5	5	5
DAY 90	MEAN		317	321	306	319
	S.D.		28.0	21.5	12.2	7.5
	N		5	5	5	5
DAY 96	MEAN		323	326	307	322
	S.D.		32.4	22.0	13.0	1.9
	N		5	5	5	5

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY -9 TO 0	MEAN		86	82	82	82	79
	S.D.		10.7	9.9	7.3	6.1	16.4
	N		10	10	10	10	5
DAY 0 TO 7	MEAN		43	43	38	41	41
	S.D.		9.4	9.8	8.0	10.6	13.8
	N		10	10	10	10	5
DAY 7 TO 14	MEAN		33	30	29	33	38
	S.D.		8.5	7.6	11.9	6.9	9.9
	N		10	10	10	10	5
DAY 14 TO 21	MEAN		30	34	30	33	32
	S.D.		10.1	6.4	8.9	9.5	5.9
	N		10	10	10	10	5
DAY 21 TO 28	MEAN		27	24	23	27	21
	S.D.		4.8	4.7	6.1	5.8	4.1
	N		10	10	10	10	5
DAY 28 TO 35	MEAN		15	4	19	16	26
	S.D.		7.1	19.7	4.1	8.7	8.0
	N		10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)					
DOSE GROUP:			1	2	3	4	5	
DOSE LEVEL (PPM):			0	1000	5000	10000	40 ^a	
DAY	35 TO	42	MEAN	19	21	15	21	22
			S.D.	5.4	7.6	6.1	6.9	4.0
			N	10	10	10	10	5
DAY	42 TO	49	MEAN	18	16	15	19	22
			S.D.	6.9	6.5	5.9	7.4	6.1
			N	10	10	10	10	5
DAY	49 TO	56	MEAN	11	14	13	1	3
			S.D.	5.6	4.1	3.3	14.8	11.1
			N	10	10	10	10	5
DAY	56 TO	63	MEAN	14	10	13	20	18
			S.D.	7.2	8.1	4.8	7.5	6.5
			N	10	10	10	10	5
DAY	63 TO	70	MEAN	10	12	10	14	16
			S.D.	8.0	5.6	3.1	4.5	4.4
			N	10	10	10	10	5
DAY	70 TO	77	MEAN	10	8	4	7	11
			S.D.	6.3	4.3	6.1	5.2	4.4
			N	10	10	10	10	5
No statistically significant differences								

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 77 TO 84	MEAN		10	15	7	11	17
	S.D.		6.2	5.9	6.3	3.4	4.1
	N		10	10	10	10	5
DAY 84 TO 90	MEAN		5	7	8	8	4
	S.D.		6.6	7.2	6.5	23.4	5.4
	N		10	10	10	10	5
DAY 0 TO 90	MEAN		246	238	224	249	270
	S.D.		47.5	51.4	24.2	43.4	50.4
	N		10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)					
DOSE GROUP:			1	2	3	4	5	
DOSE LEVEL (PPM):			0	1000	5000	10000	40 ^a	
DAY	-9 TO	0	MEAN	47	42	40	40	37
			S.D.	4.5	6.1	14.6	5.1	4.4
			N	10	10	10	10	5
DAY	0 TO	7	MEAN	19	20	21	19	25
			S.D.	6.8	5.5	8.3	4.8	7.0
			N	10	10	10	10	5
DAY	7 TO	14	MEAN	19	21	17	16	11
			S.D.	8.8	10.0	3.2	5.5	7.6
			N	10	10	10	10	5
DAY	14 TO	21	MEAN	17	12	11	15	13
			S.D.	6.2	4.9	10.2	5.7	6.8
			N	10	10	10	10	5
DAY	21 TO	28	MEAN	6	11	9	7	12
			S.D.	6.9	7.1	6.8	5.3	8.3
			N	10	10	10	10	5
DAY	28 TO	35	MEAN	11	9	13	10	4
			S.D.	6.4	5.0	6.4	5.3	11.2
			N	10	10	10	10	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 35 TO 42	MEAN		7	6	4	6	7
	S.D.		6.2	5.9	5.4	6.5	4.9
	N		10	10	10	10	5
DAY 42 TO 49	MEAN		6	9	6	3	8
	S.D.		6.4	6.1	5.6	5.2	2.7
	N		10	10	10	10	5
DAY 49 TO 56	MEAN		5	4	1	-11	2
	S.D.		4.4	6.0	7.5	14.5	3.6
	N		10	10	10	10	5
DAY 56 TO 63	MEAN		1	1	8	15**	2
	S.D.		7.0	4.6	7.3	12.9	7.6
	N		10	10	10	10	5
DAY 63 TO 70	MEAN		5	6	2	5	7
	S.D.		8.4	5.4	3.5	7.0	6.2
	N		10	10	10	10	5
DAY 70 TO 77	MEAN		2	1	1	-4	1
	S.D.		5.5	5.7	6.9	6.5	3.1
	N		10	10	10	10	5

Statistical key: ** = p<0.01

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 77 TO 84	MEAN		10	1	3	8	4
	S.D.		11.4	6.3	8.0	7.3	2.3
	N		10	10	10	9	5
DAY 84 TO 90	MEAN		-3	0	-1	-2	1
	S.D.		4.5	6.2	6.5	4.2	4.4
	N		10	10	10	9	5
DAY 0 TO 90	MEAN		104	102	95	87	96
	S.D.		20.1	17.2	26.3	16.2	12.4
	N		10	10	10	9	5

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	
DAY	-9 TO	0	MEAN	82	79	78	79
			S.D.	11.1	15.7	6.2	7.9
			N	5	5	5	5
DAY	0 TO	7	MEAN	42	43	42	38
			S.D.	14.4	8.9	11.6	4.8
			N	5	5	5	5
DAY	7 TO	14	MEAN	31	33	35	29
			S.D.	13.0	12.4	3.5	3.1
			N	5	5	5	5
DAY	14 TO	21	MEAN	35	36	35	30
			S.D.	9.7	7.4	6.9	6.7
			N	5	5	5	5
DAY	21 TO	28	MEAN	24	25	17	22
			S.D.	3.2	4.5	5.9	4.7
			N	5	5	5	5
DAY	28 TO	35	MEAN	17	24	15	12
			S.D.	4.3	7.2	7.3	4.8
			N	5	5	5	5

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 35 TO 42	MEAN		20	22	20	16
	S.D.		5.4	5.3	2.8	8.5
	N		5	5	5	5
DAY 42 TO 49	MEAN		21	16	16	14
	S.D.		3.5	4.3	3.7	8.1
	N		5	5	5	5
DAY 49 TO 56	MEAN		11	15	14	16
	S.D.		5.1	4.7	4.6	1.1
	N		5	5	5	5
DAY 56 TO 63	MEAN		18	19	18	19
	S.D.		10.3	7.1	6.8	4.8
	N		5	5	5	5
DAY 63 TO 70	MEAN		16	11	13	9
	S.D.		6.0	7.6	3.6	4.6
	N		5	5	5	5
DAY 70 TO 77	MEAN		8	8	7	7
	S.D.		7.2	5.1	5.6	2.3
	N		5	5	5	5

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 77 TO 84	MEAN		15	13	13	12
	S.D.		9.4	4.1	6.1	5.2
	N		5	5	5	5
DAY 84 TO 90	MEAN		-4	-3	1	3
	S.D.		6.6	5.8	6.3	4.4
	N		5	5	5	5
DAY 90 TO 96	MEAN		14	12	13	12
	S.D.		0.9	5.3	10.4	2.8
	N		5	5	5	5
DAY 0 TO 96	MEAN		268	274	258	241
	S.D.		71.7	60.0	18.1	34.4
	N		5	5	5	5

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY -9 TO 0	MEAN		42	44	42	34
	S.D.		6.6	8.3	8.6	5.6
	N		5	5	5	5
DAY 0 TO 7	MEAN		23	21	22	24
	S.D.		5.5	6.0	9.1	10.4
	N		5	5	5	5
DAY 7 TO 14	MEAN		15	19	16	15
	S.D.		7.0	2.9	11.4	4.4
	N		5	5	5	5
DAY 14 TO 21	MEAN		16	10	13	17
	S.D.		13.8	6.6	3.5	6.1
	N		5	5	5	5
DAY 21 TO 28	MEAN		5	10	8	5
	S.D.		12.8	6.4	7.6	2.9
	N		5	5	5	5
DAY 28 TO 35	MEAN		11	13	13	17
	S.D.		7.1	5.1	12.8	15.1
	N		5	5	5	5

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	
DAY	35 TO	42	MEAN	12	9	5	12
			S.D.	5.8	4.2	8.2	13.2
			N	5	5	5	5
DAY	42 TO	49	MEAN	4	4	4	3
			S.D.	2.9	3.0	5.9	5.9
			N	5	5	5	5
DAY	49 TO	56	MEAN	4	2	0	3
			S.D.	11.0	4.9	4.0	2.7
			N	5	5	5	5
DAY	56 TO	63	MEAN	9	8	5	7
			S.D.	11.7	3.4	6.4	3.4
			N	5	5	5	5
DAY	63 TO	70	MEAN	2	4	2	5
			S.D.	9.1	5.0	4.8	4.3
			N	5	5	5	5
DAY	70 TO	77	MEAN	3	0	4	1
			S.D.	4.7	2.7	4.5	4.6
			N	5	5	5	5
No statistically significant differences							

No statistically significant differences

TABLE 5

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN BODY WEIGHT CHANGE FROM INTERVAL TO INTERVAL (GRAMS)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 77 TO 84	MEAN		0	8	.3	3
	S.D.		3.0	4.2	5.2	2.8
	N		5	5	5	5
DAY 84 TO 90	MEAN		1	1	-1	2
	S.D.		6.5	3.7	7.0	7.0
	N		5	5	5	5
DAY 90 TO 96	MEAN		6	5	1	3
	S.D.		5.7	4.0	10.4	8.9
	N		5	5	5	5
DAY 0 TO 96	MEAN		111	114	95	117
	S.D.		29.1	17.6	8.9	11.1
	N		5	5	5	5

No statistically significant differences

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 ^a 40 ^a
DAY 0	MEAN		100	98	97	97	98
	S.D.		2.8	3.1	3.1	3.5	5.1
	N		10	10	10	10	5
DAY 7	MEAN		83	81	79*	79*	82
	S.D.		3.3	3.4	3.7	1.4	3.2
	N		10	10	10	10	5
DAY 14	MEAN		71	70	70	70	73
	S.D.		2.6	2.8	4.8	2.6	1.4
	N		10	10	10	10	5
DAY 21	MEAN		65	68	65	66	67
	S.D.		3.1	1.7	3.1	3.0	1.5
	N		10	10	10	10	5
DAY 28	MEAN		61	61	59	61	61
	S.D.		2.3	2.2	2.7	2.1	4.2
	N		10	10	10	10	5
DAY 35	MEAN		56	53	56	55	58
	S.D.		2.6	7.3	2.1	2.2	2.6
	N		10	10	10	10	5
DAY 42	MEAN		56	55	54	54	56
	S.D.		2.0	2.8	2.4	2.1	3.1
	N		10	10	10	10	5
DAY 49	MEAN		54	53	52	52	54
	S.D.		2.3	2.5	1.6	2.8	2.3
	N		10	10	10	10	5
DAY 56	MEAN		50	51	50	44*	47
	S.D.		2.1	3.1	1.3	4.6	4.0
	N		10	10	10	10	5

Statistical key: * = p<0.05

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 63	MEAN		50	52	50	50	51
	S.D.		1.4	3.1	2.0	2.7	2.5
	N		10	10	10	10	5
DAY 70	MEAN		48	49	48	49	52*
	S.D.		1.4	3.0	1.5	2.4	3.6
	N		10	10	10	10	5
DAY 77	MEAN		48	49	48	47	50
	S.D.		1.5	3.5	2.5	2.3	2.7
	N		10	10	10	10	5
DAY 84	MEAN		47	50*	45	46	48
	S.D.		1.6	4.0	2.5	2.3	2.4
	N		10	10	10	10	5
DAY 90	MEAN		45	47	45	45	47
	S.D.		1.7	3.7	3.1	2.3	2.5
	N		10	10	10	10	5

Statistical key: * = p<0.05

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY	0	MEAN	97	96	95	93	92
		S.D.	5.8	8.3	6.2	4.5	3.3
		N	8	7	9	10	4
DAY	7	MEAN	82	84	85	81	88
		S.D.	6.4	5.6	3.9	4.3	5.1
		N	8	5	8	10	4
DAY	14	MEAN	79	81	76	76	80
		S.D.	3.4	6.1	3.0	3.6	8.2
		N	9	7	8	10	4
DAY	21	MEAN	76	79	74	74	75
		S.D.	6.0	5.3	4.4	3.5	3.1
		N	9	6	9	10	2
DAY	28	MEAN	70	70	69	68	75
		S.D.	4.1	4.1	3.3	4.8	0.7
		N	9	5	10	10	2
DAY	35	MEAN	69	75	68	67	78
		S.D.	3.6	6.7	4.7	4.6	21.8
		N	9	6	9	10	3
DAY	42	MEAN	64	68	60	62	66
		S.D.	5.8	5.7	8.9	2.9	4.1
		N	10	9	10	10	3
DAY	49	MEAN	62	63	62	58	64
		S.D.	4.3	3.3	2.5	2.4	5.0
		N	10	5	9	9	3
DAY	56	MEAN	60	63	58	46**	61
		S.D.	4.5	5.1	3.5	11.7	4.0
		N	10	7	10	9	3

Statistical key: ** = p<0.01

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)				
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000	5 40 ^a
DAY 63	MEAN		59	64	61	63	62
	S.D.		4.0	7.0	2.9	9.6	4.1
	N		10	8	10	10	3
DAY 70	MEAN		57	60	58	57	62
	S.D.		5.6	5.2	1.9	3.4	2.6
	N		10	8	10	10	5
DAY 77	MEAN		58	59	57	53	60
	S.D.		3.5	4.8	2.6	8.3	2.5
	N		10	9	10	10	5
DAY 84	MEAN		56	59	56	55	61
	S.D.		5.5	4.1	4.0	3.2	4.6
	N		10	8	10	9	3
DAY 90	MEAN		54	57	54	52	58
	S.D.		5.2	6.2	2.5	3.3	1.9
	N		10	10	10	9	3

No statistically significant differences

^aPositive control animals for micronucleus study only (cyclophosphamide at 40 mg/kg, IP).

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY	0	MEAN	100	99	96	95
		S.D.	4.1	5.2	2.7	3.1
		N	5	5	5	5
DAY	7	MEAN	82	83	80	79
		S.D.	4.7	4.1	3.4	2.8
		N	5	5	5	5
DAY	14	MEAN	72	74	71	70
		S.D.	5.5	5.1	1.1	2.2
		N	5	5	5	5
DAY	21	MEAN	68	68	68	65
		S.D.	3.1	2.6	2.3	1.0
		N	5	5	5	5
DAY	28	MEAN	62	62	60	60
		S.D.	1.6	1.0	2.1	2.2
		N	5	5	5	5
DAY	35	MEAN	60	61	57*	56*
		S.D.	2.0	1.1	2.4	1.2
		N	5	5	5	5
DAY	42	MEAN	58	58	56	55
		S.D.	2.4	0.9	1.9	2.7
		N	5	5	5	5
DAY	49	MEAN	55	54	55	53
		S.D.	1.7	2.2	1.2	2.1
		N	5	5	5	5
DAY	56	MEAN	51	53	53	52
		S.D.	2.8	5.0	1.4	2.0
		N	5	5	5	5

Statistical key: * = p<0.05

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

MALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 63	MEAN		53	48	52	52
	S.D.		2.9	6.2	2.1	1.7
	N		5	4	5	5
DAY 70	MEAN		53	49	51	49
	S.D.		2.5	2.2	1.9	2.2
	N		5	4	5	5
DAY 77	MEAN		50	50	50	49
	S.D.		2.0	3.7	1.9	1.8
	N		5	5	5	5
DAY 84	MEAN		49	46	47	47
	S.D.		9.5	3.6	1.6	2.8
	N		5	4	5	5
DAY 90	MEAN		45	45	44	45
	S.D.		3.4	3.6	2.2	2.0
	N		5	5	5	5
DAY 96	MEAN		49	47	50	49
	S.D.		1.6	3.0	2.0	6.0
	N		5	5	5	5

No statistically significant differences

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY	0	MEAN	99	93	99	93
		S.D.	4.5	2.8	4.6	5.0
		N	5	4	5	5
DAY	7	MEAN	87	82	90	84
		S.D.	2.6	5.2	6.5	2.2
		N	5	3	5	5
DAY	14	MEAN	79	76	79	75
		S.D.	2.4	2.8	4.0	1.7
		N	4	4	5	4
DAY	21	MEAN	80	77	79	77
		S.D.	3.4	0.8	4.0	1.8
		N	5	3	5	5
DAY	28	MEAN	71	68	69	70
		S.D.	3.1	1.5	4.6	3.1
		N	5	4	5	5
DAY	35	MEAN	74	70	71	72
		S.D.	2.7	2.0	8.5	1.7
		N	5	4	5	5
DAY	42	MEAN	70	66	67	67
		S.D.	2.4	2.0	4.5	1.9
		N	4	5	5	5
DAY	49	MEAN	67	63	61	63
		S.D.	5.5	3.0	3.4	2.9
		N	4	5	5	5
DAY	56	MEAN	62	58	59	60
		S.D.	3.2	3.3	4.4	2.9
		N	5	5	5	5

No statistically significant differences

TABLE 6

LIQUIFIED PETROLEUM GAS: A 13-WEEK WHOLE-BODY INHALATION
TOXICITY STUDY IN RATS WITH NEUROTOXICITY ASSESSMENTS AND
IN VIVO GENOTOXICITY ASSESSMENTS

FEMALES			MEAN FEED CONSUMPTION VALUES (GRAMS/KG/DAY)			
DOSE GROUP: DOSE LEVEL (PPM):			1 0	2 1000	3 5000	4 10000
DAY 63	MEAN		67	61	62	62
	S.D.		5.0	2.1	6.5	3.9
	N		5	5	5	5
DAY 70	MEAN		62	58	58	58
	S.D.		4.1	3.4	6.4	1.5
	N		5	5	5	5
DAY 77	MEAN		60	58	61	59
	S.D.		6.6	2.3	5.5	0.9
	N		5	5	5	5
DAY 84	MEAN		59	56	59	56
	S.D.		7.0	4.8	6.0	0.5
	N		5	4	4	5
DAY 90	MEAN		57	53	58	55
	S.D.		5.1	4.2	9.1	1.8
	N		5	5	5	5
DAY 96	MEAN		63	59	62	59
	S.D.		4.5	3.5	4.5	4.2
	N		5	5	5	5

No statistically significant differences

		Mean Estrous Cyclicity			Table 7
GROUP EXPOSURE LEVEL (ppm)		1 0	2 1000	3 5000	4 10000
FEMALES EXAMINED	N	10	10	10	10
CYCLE LENGTH (days)	MEAN	4.4 0.60 9	4.3 0.57 10	4.2 0.36 8	4.1 0.17 10

LIQUIFIED PETROLEUM GAS

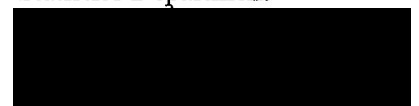
**A 13-WEEK WHOLE-BODY INHALATION TOXICITY STUDY IN RATS WITH
NEUROTOXICITY ASSESSMENTS AND IN VIVO GENOTOXICITY ASSESSMENTS**

Statistical Analysis

Author



Statistics Department



4-Feb-10

COMPLIANCE STATEMENT

This phase of the study was conducted in compliance with the following Good Laboratory Practice standards and I consider the data generated to be valid:

EPA Good Laboratory Practices as set forth in 40 CFR Part 792 (TSCA).

The UK Good Laboratory Practice Regulations (Statutory Instrument 1999 No 3106 as amended by Statutory Instrument 2004 No. 994).

OECD Principles of Good Laboratory Practice (as revised in 1997), ENV/MC/CHEM(98)17.

EC Commission Directive 2004/10/EC of 11 February 2004 (Official Journal No L 50/44).

These principles of Good Laboratory Practice are accepted by the regulatory authorities of the United States of America and Japan on the basis of intergovernmental agreements.

Principal Investigator



4th February 2020



STUDY PERSONNEL

Original Principal Investigator

[REDACTED]

The original analysis was performed by [REDACTED] As he has since left the company [REDACTED] has been appointed the new principle investigator and the analysis has been completed by [REDACTED]

Replacement Principal Investigator

[REDACTED]

INTRODUCTION AND EXPERIMENTAL DESIGN

This rat study had a control and three groups treated with LPG at 1000 ppm, 5000 ppm and 10000 ppm. There were 10 animals per sex per group.

The statistical analysis of the following parameters is described in this phase report. All parameters were measured at pre-dose, week 2, week 4, week 8 and week 13.

Motor activity

One session per timepoint, each session comprising 12 five-minute intervals.

Continuous FOB parameters

Body weight
Forelimb grip strength
Hindlimb grip strength
Landing foot splay
Body temperature

Discrete FOB parameters

Home cage

Posture, Vocalizations, Palpebral closure, Motor movements

Handling

Ease of removal, Ease of handling, Chromodacryorrhea, Lacrimation, Coat, Salivation

Open field

Gait and posture, Locomotion, Arousal, Piloerection, Exophthalmia, Feces, Urine

Motor movements

Fasciculations, Convulsions, Tremors

Reflex assessments

Approach response, Audition, Pain, Pupil response, Pinna, Proprioception, Air righting reflex

PROTOCOL DEVIATIONS

For motor activity, the SAS programs would not run in a reasonable timescale because the dataset was too large for the proposed statistical methodology. Hence the statistical model

was simplified as described below. It is believed that this change would have had only minimal effect on the main comparisons.

METHODOLOGY

Motor activity

Repeated measures mixed modelling (using Proc Mixed in SAS) was applied to the motor activity data. The model proposed in the protocol included fixed terms for sex, group and their interaction, random animal, fixed period with autoregressive AR(1) correlation and (five-minute) interval with unstructured correlation (Galecki 1994). However the input dataset contained over 4000 observations and the program would not run in a reasonable timescale. Hence the model was simplified by removing the interval term and analyzing the mean over the 12 intervals. This is only a minor modification since even in the original model comparisons between sexes, groups and periods would all be based on (weighted) means over the intervals. If the group term in the analysis was significant at the 5% level, then each treatment group was compared with the control using Dunnett's test (Dunnett 1955, 1964).

The residuals were checked using the Kolmogorov-Smirnov test (Stephens 1974). If the test was significant at the 1% level, a Blom-transformation (SAS Institute 1999) was considered.

Continuous FOB parameters

For Forelimb grip strength, hindlimb grip strength and landing foot splay an average of two trials was calculated. Where only one measurement was taken the average response is treated as a missing observation.

Repeated measures mixed modelling (using Proc Mixed in SAS) was applied to the continuous FOB parameters. The model included fixed terms for sex, group and their interaction, random animal, fixed period with AR(1) correlation, the group-by-period interaction, with pre-dose as covariate. The residuals were checked using the Kolmogorov-Smirnov test (Stephens 1974). If the test was significant at the 1% level, a Blom-transformation (SAS Institute 1999) was considered. If the group term in the analysis was significant at the 5% level, then each treatment group was compared with the control using *t*-tests. If either of the interactions were strongly significant (*p*-values for interaction tests in ANOVA table are less than 0.001), then further tests were performed using the SLICE option in Proc Mixed.

Discrete FOB parameters

Repeated measures mixed modelling (using Proc Genmod in SAS), with multinomial distribution and cumulative logit link (Agresti 1989) was used for the discrete FOB parameters. The model included fixed terms for sex, group, random animal, fixed period and pre-dose as covariate. If the dose group effect in the model was statistically significant, each dose group was compared with the control group using pairwise contrasts. Many of the parameters had an insufficient number of non-normal findings to allow this analysis to be carried out.

For the purposes of statistical analysis, Feces and Urine were re-coded as follows:
0, 1, 2 to 0, 1, 2 (ie no change), 3-4 to 3, 5-8 to 4 and 9-16 to 5.

DATA HANDLING

Data were received as text files or MS Excel files and re-formatted for software input. The software used for all the analyses was SAS® 8.2 (SAS Institute 1999).

RESULTS

Motor activity

Summary statistics by interval and by week are shown in Tables 1 and 2 respectively. The Kolmogorov-Smirnov test was significant ($p < 0.01$), hence the analysis was repeated using Blom-transformed data. The statistical results for both analyses are shown in Table 3. There was very little difference between the results of the two analyses.

The results for the transformed data can be summarised as follows:

Although a clear sex difference was seen ($p = 0.003$), no statistically significant differences between treatment groups were found ($p = 0.947$). There was also no evidence that the difference between sexes varied over groups ($p = 0.541$). Although there was a clear period effect ($p < 0.001$), reflecting a distinct reduction at week 13, the group-by-period interaction was not significant ($p = 0.111$), suggesting that this effect was similar across the sexes.

Continuous FOB parameters

Summary statistics by week are shown in Tables 4 to 8. Means pooled over weeks and statistical results are shown in Table 9. A summary of the results is:

Bodyweight	Sex difference (M>F), no group effects, change (increase) over weeks
Grip: Forelimb	Sex difference (M>F), significant group effects, change (increase) over weeks
Grip: Hindlimb	Sex difference (M>F), no group effects, weak change (increase) over weeks
Landing splay	Weak sex difference (M>F), no group effects, change (decrease) over weeks
Temperature	Clear sex difference (M<F), no group effects, change (decrease) over weeks

The Kolmogorov-Smirnov test was not significant for any parameter.

Only for Forelimb grip strength was there any evidence of differences between groups or for a sex-by-group interaction. For this parameter, comparisons within-sex were made. There were significant differences between groups for the Males (5000 ppm $p = 0.018$, 10000 ppm $p < 0.001$), and for Females (1000 ppm $p = 0.015$).

Discrete FOB parameters

Summary statistics are shown in Table 10. Only seven parameters had a sufficient number of non-normal findings to allow statistical analysis to be carried out:

Although clear sex differences were seen in Arousal, Piloerection, Feces and Urine, no statistically significant differences were found between groups for any parameter.

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TABLE 1**Motor activity, by interval, pooled over sexes and weeks**

		Dose (ppm)			
		0	1000	5000	10000
5-min interval	n	mean (sd)	mean (sd)	mean (sd)	mean (sd)†
1	100	175.9 (41.5)	173.7 (44.0)	168.7 (43.8)	174.7 (48.6)
2	100	117.0 (47.5)	123.5 (39.3)	116.6 (48.3)	128.5 (45.9)
3	100	75.1 (48.9)	82.2 (49.5)	88.4 (54.5)	84.4 (45.3)
4	100	47.6 (50.9)	48.8 (43.2)	50.5 (47.1)	44.6 (41.4)
5	100	30.0 (44.0)	27.3 (32.9)	32.6 (40.6)	24.4 (37.1)
6	100	20.8 (39.8)	16.0 (29.5)	19.7 (34.7)	20.1 (32.7)
7	100	13.2 (30.2)	10.7 (22.5)	15.3 (33.4)	12.6 (26.5)
8	100	14.7 (38.6)	9.2 (25.2)	11.4 (27.2)	7.1 (19.0)
9	100	6.1 (15.0)	9.7 (26.6)	9.1 (22.8)	9.0 (24.9)
10	100	7.5 (20.7)	9.8 (25.5)	12.4 (32.0)	9.4 (27.5)
11	100	8.3 (22.1)	5.3 (13.8)	7.8 (21.7)	9.3 (22.7)
12	100	7.2 (21.2)	7.5 (18.1)	10.0 (24.1)	8.2 (23.2)

n=100 for mean activity calculated over 20 animals and periods pre-dose, weeks 2, 4, 8 and 13

sd = standard deviation

† sample size = 99

TABLE 2

Motor activity, by sex

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	52.8 (27.3)	10	43.9 (5.2)	48.3
	1000	10	55.7 (19.6)	10	50.4 (27.1)	53.1
	5000	10	47.0 (21.0)	10	57.3 (23.9)	52.2
	10000	10	52.5 (11.7)	10	54.6 (21.8)	53.6
Week 2	0	10	47.1 (27.0)	10	40.1 (8.3)	43.6
	1000	10	36.0 (13.4)	10	32.9 (9.0)	34.5
	5000	10	47.0 (20.5)	10	38.3 (12.8)	42.7
	10000	10	47.7 (11.7)	10	36.9 (10.5)	42.3
Week 4	0	10	43.9 (21.0)	10	37.7 (11.1)	40.8
	1000	10	47.9 (8.5)	10	34.9 (10.8)	41.4
	5000	10	50.9 (24.7)	10	36.2 (10.3)	43.5
	10000	10	45.3 (9.2)	10	31.2 (13.8)	38.2
Week 8	0	10	43.5 (24.4)	10	33.8 (10.8)	38.6
	1000	10	43.0 (16.0)	10	37.4 (19.3)	40.2
	5000	10	40.5 (12.6)	10	43.9 (14.1)	42.2
	10000	10	39.3 (14.4)	10	33.4 (9.5)	36.3
Week 13	0	10	30.1 (11.2)	10	29.7 (14.4)	29.9
	1000	10	37.1 (10.8)	10	27.5 (9.6)	32.3
	5000	10	29.8 (16.0)	10	26.3 (8.0)	28.0
	10000	10	38.4 (10.1)	9	28.8 (7.4)	33.9

Mean motor activity per group calculated over the 12 intervals.

n = number of animals, sd = standard deviation

TABLE 3

Motor activity, pooled over weeks, adjusted for pre-dose - untransformed

Dose (ppm)	Male adjusted mean	Female adjusted mean	Model terms	<i>p</i> -values
0	40.9	36.9	sex	<i>p</i> =0.001
1000	40.3	33.4	group	<i>p</i> =0.815
5000	42.4	35.7	sex*group	<i>p</i> =0.766
10000	42.3	32.5	period	<i>p</i> <0.001
			group*period	<i>p</i> =0.205

Motor activity, pooled over weeks, adjusted for pre-dose - transformed

Dose (ppm)	Male adjusted mean	Female adjusted mean	Model terms	<i>p</i> -values
0	0.088	-0.038	sex	<i>p</i> =0.003
1000	0.169	-0.291	group	<i>p</i> =0.947
5000	0.221	-0.140	sex*group	<i>p</i> =0.541
10000	0.318	-0.329	period	<i>p</i> <0.001
			group*period	<i>p</i> =0.111

TABLE 4

Continuous FOB parameters: Bodyweight (g)

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	227.3 (19.7)	10	183.1 (10.3)	205.2
	1000	10	224.9 (17.9)	10	182.7 (10.3)	203.8
	5000	10	224.7 (10.1)	10	182.9 (13.1)	203.8
	10000	10	226.6 (12.2)	10	179.6 (12.9)	203.1
Week 2	0	10	333.3 (31.2)	10	238.8 (10.9)	286.1
	1000	10	336.6 (38.4)	10	236.3 (12.1)	286.5
	5000	10	331.0 (17.6)	10	235.8 (16.8)	283.4
	10000	10	334.2 (17.7)	10	228.5 (13.4)	281.4
Week 4	0	10	395.7 (43.8)	10	270.4 (15.2)	333.0
	1000	10	402.9 (49.9)	10	266.5 (8.6)	334.7
	5000	10	393.2 (24.2)	10	264.6 (16.2)	328.9
	10000	10	398.0 (27.7)	10	259.6 (13.7)	328.8
Week 8	0	10	475.8 (54.3)	10	299.9 (21.7)	387.9
	1000	10	481.5 (60.0)	10	302.5 (17.7)	392.0
	5000	10	461.9 (26.2)	10	294.1 (17.3)	378.0
	10000	10	470.6 (45.6)	10	287.7 (18.7)	379.1
Week 13	0	10	516.0 (61.2)	10	316.4 (28.7)	416.2
	1000	10	538.6 (72.8)	10	321.0 (18.8)	429.8
	5000	10	511.2 (27.8)	10	309.7 (26.9)	410.4
	10000	10	525.0 (55.0)	9	305.8 (18.8)	421.2

n = number of animals, sd = standard deviation

TABLE 5

Continuous FOB parameters: Forelimb grip strength (g)

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	903.8 (61.5)	10	816.8 (89.2)	860.3
	1000	10	856.8 (89.0)	10	761.8 (116.2)	809.3
	5000	10	835.5 (123.6)	10	769.5 (82.9)	802.5
	10000	10	886.3 (61.8)	10	832.3 (109)	859.3
Week 2	0	10	1123.0 (201.7)	10	1113.5 (57.0)	1118.3
	1000	10	1025.0 (110.2)	10	967.3 (184.3)	996.1
	5000	10	1067.3 (125.9)	10	986.3 (181.9)	1026.8
	10000	10	1116.0 (120.7)	10	1034.0 (144.0)	1075.0
Week 4	0	10	933.5 (182.2)	10	937.8 (195.2)	935.6
	1000	10	883.8 (228.3)	10	832.3 (189.3)	858.0
	5000	10	946.0 (141.2)	10	953.8 (195.7)	949.9
	10000	10	1127.8 (151.5)	10	773.5 (224.9)	950.6
Week 8	0	10	963.5 (276.9)	10	1077.8 (95.7)	1020.6
	1000	10	970.3 (234.5)	10	888.5 (242.6)	929.4
	5000	10	1110.8 (329.9)	10	972.0 (210.3)	1041.4
	10000	9	1355.0 (312.8)	10	953.0 (263.8)	1143.4
Week 13	0	10	1121.0 (155.8)	10	1058.3 (211.8)	1089.6
	1000	10	1073.0 (211.9)	10	797.8 (217.9)	935.4
	5000	10	1339.3 (238.4)	10	875.3 (206.1)	1107.3
	10000	10	1361.5 (251.1)	9	1078.1 (153.0)	1227.2

n = number of animals, sd = standard deviation

TABLE 6

Continuous FOB parameters: Hindlimb grip strength (g)

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	474.5 (134.8)	10	531.0 (77.1)	502.8
	1000	10	497.0 (76.5)	10	547.0 (141.5)	522.0
	5000	10	493.3 (73.3)	10	485.3 (93.3)	489.3
	10000	10	510.8 (68.8)	10	466.8 (79.4)	488.8
Week 2	0	10	678.3 (140.1)	10	718.0 (149.2)	698.1
	1000	10	736.3 (131.3)	10	650.5 (95.7)	693.4
	5000	10	585.5 (143.8)	10	671.3 (123.8)	628.4
	10000	10	644.3 (109.4)	10	594.5 (145.8)	619.4
Week 4	0	10	730.0 (169.4)	10	645.3 (116.7)	687.6
	1000	10	702.0 (222.5)	10	637.0 (108.0)	669.5
	5000	10	598.3 (136.7)	10	719.8 (222.6)	659.0
	10000	10	692.5 (140.8)	10	675.0 (188.5)	683.8
Week 8	0	10	668.0 (168.3)	10	669.3 (202.1)	668.6
	1000	10	793.5 (178.5)	10	685.3 (165.5)	739.4
	5000	10	750.8 (191.3)	10	667.5 (161.5)	709.1
	10000	10	808.0 (156.6)	10	632.3 (111.7)	720.1
Week 13	0	10	720.8 (155.7)	10	647.0 (171.2)	683.9
	1000	10	635.0 (162.2)	10	652.3 (162.3)	643.6
	5000	10	751.8 (212.0)	10	676.0 (170.2)	713.9
	10000	10	783.8 (105.6)	9	626.1 (192.1)	709.1

n = number of animals, sd = standard deviation

TABLE 7

Continuous FOB parameters: Landing foot splay (cm)

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	7.5 (1.2)	10	6.9 (1.7)	7.2
	1000	10	7.4 (1.1)	10	6.3 (1.4)	6.8
	5000	10	7.4 (1.2)	10	6.3 (1.4)	6.9
	10000	10	7.3 (1.4)	10	5.7 (1.0)	6.5
Week 2	0	10	7.6 (1.0)	10	7.4 (0.7)	7.5
	1000	10	7.5 (1.2)	10	6.4 (1.7)	7.0
	5000	10	7.5 (1.2)	10	5.9 (0.9)	6.7
	10000	10	6.9 (1.4)	10	5.8 (0.7)	6.4
Week 4	0	10	7.3 (0.8)	10	6.9 (1.3)	7.1
	1000	10	6.9 (1.1)	10	6.1 (1.2)	6.5
	5000	10	7.2 (1.6)	10	6.4 (1.1)	6.8
	10000	10	7.1 (1.5)	10	6.1 (0.9)	6.6
Week 8	0	10	7.0 (0.9)	10	6.7 (1.0)	6.9
	1000	10	6.4 (0.7)	10	5.6 (1.2)	6.0
	5000	10	6.5 (1.4)	10	5.9 (1.4)	6.2
	10000	10	6.8 (1.4)	10	6.2 (0.8)	6.5
Week 13	0	10	7.0 (1.1)	10	5.8 (1.0)	6.4
	1000	10	6.8 (0.9)	10	5.8 (1.4)	6.3
	5000	10	6.5 (1.9)	10	6.1 (1.2)	6.3
	10000	10	6.7 (1.7)	9	5.9 (0.9)	6.3

n = number of animals, sd = standard deviation

TABLE 8

Continuous FOB parameters: Temperature (C)

Occasion	Dose (ppm)	n	Males mean (sd)	n	Females mean (sd)	Pooled mean
Pre-dose	0	10	37.9 (0.7)	10	38.0 (0.5)	37.9
	1000	10	38.0 (0.6)	10	38.1 (0.6)	38.0
	5000	10	37.9 (0.6)	10	38.4 (0.6)	38.1
	10000	10	37.6 (0.7)	10	38.2 (0.6)	37.9
Week 2	0	10	37.0 (0.6)	10	37.9 (0.7)	37.5
	1000	10	36.7 (0.8)	10	38.1 (0.7)	37.4
	5000	10	36.9 (0.6)	10	38.3 (0.6)	37.6
	10000	10	37.3 (0.8)	10	38.0 (0.8)	37.6
Week 4	0	10	36.0 (0.6)	10	36.8 (0.7)	36.4
	1000	10	36.4 (1.0)	10	37.5 (1.1)	37.0
	5000	10	36.1 (0.9)	10	37.7 (0.8)	36.9
	10000	10	36.6 (0.8)	10	37.9 (0.6)	37.2
Week 8	0	10	37.2 (1.0)	10	37.5 (1.0)	37.4
	1000	10	37.5 (1.0)	10	37.9 (0.9)	37.7
	5000	10	36.9 (0.9)	10	37.7 (1.0)	37.3
	10000	10	36.7 (0.6)	10	37.5 (0.9)	37.1
Week 13	0	10	36.6 (1.0)	10	37.5 (1.0)	37.1
	1000	10	37.0 (1.0)	10	37.4 (0.9)	37.2
	5000	10	36.7 (0.8)	10	37.8 (0.7)	37.2
	10000	10	36.9 (1.0)	9	37.8 (0.8)	37.3

n = number of animals, sd = standard deviation

TABLE 9

Continuous FOB parameters, pooled over weeks, adjusted for pre-dose

Parameter	Dose (ppm)	Male adjusted mean	Comparisons to control <i>p</i> -values	Female adjusted mean	Comparisons to control <i>p</i> -values	Model terms	<i>p</i> -values
BW (g)	0	398.0		310.6		sex	<i>p</i> <0.001
	1000	411.7		310.6		group	<i>p</i> =0.768
	5000	396.2		305.0		sex*group	<i>p</i> =0.911
	10000	401.3		304.2		period group*period	<i>p</i> <0.001 <i>p</i> =0.933
Forelimb (g)	0	988.9	<i>p</i> =0.802 <i>p</i> =0.018 <i>p</i> <0.001	1054.4	<i>p</i> =0.015 <i>p</i> =0.199 <i>p</i> =0.103	sex	<i>p</i> =0.003
	1000	975.2		917.8*		group	<i>p</i> =0.007
	5000	1122.4 *		983.4		sex*group	<i>p</i> =0.002
	10000	1195.0 **		964.2		period group*period	<i>p</i> <0.001 <i>p</i> =0.334
Hindlimb (g)	0	710.0		657.6		sex	<i>p</i> =0.032
	1000	715.6		638.3		group	<i>p</i> =0.991
	5000	675.9		690.1		sex*group	<i>p</i> =0.412
	10000	728.2		646.1		period group*period	<i>p</i> =0.160 <i>p</i> =0.223
Splay (cm)	0	7.0		6.6		sex	<i>p</i> =0.064
	1000	6.7		6.2		group	<i>p</i> =0.522
	5000	6.7		6.3		sex*group	<i>p</i> =0.913
	10000	6.7		6.5		period group*period	<i>p</i> =0.002 <i>p</i> =0.118
Temp (C)	0	36.7		37.4		sex	<i>p</i> <0.001
	1000	36.9		37.7		group	<i>p</i> =0.382
	5000	36.6		37.9		sex*group	<i>p</i> =0.513
	10000	36.9		37.8		period group*period	<i>p</i> <0.001 <i>p</i> =0.038

* = *p*<0.05, ** = *p*<0.01 for comparisons vs. control (*t*-tests)
n = number of animals, sd = standard deviation

TABLE 10

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20)	1000 ppm (n=20)	5000 ppm (n=20)	10000 ppm (n=20)	Results	
		mean	mean	mean	mean	<i>p</i> -values	
Home cage: Posture	Pre	1.00	1.00	1.30	1.00	sex group period	<i>p</i> =0.7589
	2	1.10	1.10	1.20	1.40		<i>p</i> =0.1115
	4	1.10	1.00	1.00	1.10		<i>p</i> =0.0171
	8	1.30	1.10	1.10	1.30		
	13	1.00	1.00	1.00	1.11		
	Vocalizations	Pre	1.00	1.00	1.00	1.00	n/a
2		1.00	1.00	1.00	1.00		
4		1.00	1.00	1.00	1.00		
8		1.00	1.00	1.00	1.00		
13		1.00	1.00	1.00	1.00		
Palpebral closure		Pre	1.00	1.00	1.45	1.00	sex group period
	2	1.15	1.15	1.30	1.60	<i>p</i> =0.0849	
	4	1.00	1.00	1.00	1.15	<i>p</i> =0.0078	
	8	1.45	1.15	1.15	1.50		
	13	1.00	1.00	1.00	1.16		
	Motor movements	Pre	1.00	1.00	1.00	1.00	n/a
2		1.00	1.00	1.00	1.00		
4		1.00	1.00	1.00	1.00		
8		1.00	1.00	1.00	1.00		
13		1.00	1.00	1.00	1.00		
Handling: Ease of removal		Pre	1.20	1.15	1.25	1.25	sex group period
	2	1.05	1.05	1.15	1.05	<i>p</i> =0.1986	
	4	1.00	1.10	1.10	1.00	<i>p</i> =0.7898	
	8	1.10	1.05	1.10	1.00		
	13	1.10	1.00	1.10	1.00		

n = number of animals

p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

TABLE 10 (cont'd)

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20) mean	1000 ppm (n=20) mean	5000 ppm (n=20) mean	10000 ppm (n=20) mean		
Ease of handling	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.15	1.00	1.05	1.00		
Chromodacryorrhea	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.05	1.00	1.00	1.00		
	8	1.05	1.00	1.00	1.00		
	13	1.05	1.00	1.00	1.00		
Lacrimation	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.05	1.00	1.00	1.00		
	13	1.10	1.00	1.00	1.00		
Coat	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Salivation	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		

n = number of animals

p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

TABLE 10 (cont'd)

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20) mean	1000 ppm (n=20) mean	5000 ppm (n=20) mean	10000 ppm (n=20) mean		
Open field							
Gait and posture	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Locomotion	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Arousal	Pre	4.00	4.00	4.00	4.00	sex group period	$p=0.0004$ $p=0.7681$ $p=0.0492$
	2	4.00	4.05	4.00	3.95		
	4	3.95	3.95	3.85	3.95		
	8	3.80	3.85	3.90	3.85		
	13	3.75	3.95	3.95	4.00		
Piloerection	Pre	1.00	1.00	1.00	1.00	sex group period	$p<0.0001$ $p=0.2057$ $p<0.0001$
	2	1.45	1.70	1.50	1.55		
	4	1.70	1.65	1.45	1.60		
	8	1.45	1.45	1.25	1.60		
	13	1.25	1.30	1.15	1.21		
Exophthalmia	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		

n = number of animals

 p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

TABLE 10 (cont'd)

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20) mean	1000 ppm (n=20) mean	5000 ppm (n=20) mean	10000 ppm (n=20) mean		
Feces	Pre	0.65	0.05	0.30	0.05	sex group period	$p<0.0001$
	2	0.95	0.55	0.90	0.50		$p=0.9082$
	4	0.65	0.40	0.75	1.00		$p=0.7079$
	8	1.05	0.80	0.80	0.60		
	13	0.90	1.10	0.45	1.11		
Urine	Pre	0.35	0.35	0.90	0.30	sex group period	$p<0.0001$
	2	0.55	0.50	0.70	0.05		$p=0.2829$
	4	1.10	0.65	1.30	0.75		$p=0.0015$
	8	0.95	0.90	1.35	2.55		
	13	0.15	0.35	1.40	2.58		
Motor movements							
Fasciculations	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Convulsions	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Tremors	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		

n = number of animals

p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

TABLE 10 (cont'd)

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20) mean	1000 ppm (n=20) mean	5000 ppm (n=20) mean	10000 ppm (n=20) mean		
Reflex assessments							
Approach response	Pre	2.00	2.00	2.00	2.00	n/a	
	2	2.00	2.00	2.00	2.00		
	4	2.00	2.00	2.00	2.00		
	8	2.00	2.00	2.00	2.00		
	13	2.00	2.00	2.00	2.00		
Audition	Pre	3.00	3.00	3.00	3.00	n/a	
	2	3.00	3.00	3.00	3.00		
	4	3.00	3.00	3.00	3.00		
	8	3.00	3.00	3.00	3.00		
	13	3.00	3.00	3.00	3.00		
Pain	Pre	2.00	2.00	2.00	2.00	n/a	
	2	2.00	2.00	2.00	2.00		
	4	2.00	2.00	2.00	2.00		
	8	2.00	2.00	2.00	2.00		
	13	2.00	2.00	2.00	2.00		
Pupil response	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Pinna	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		

n = number of animals

p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

TABLE 10 (cont'd)

Discrete FOB parameters, pooled over sex

Parameter	Week	0 (n=20) mean	1000 ppm (n=20) mean	5000 ppm (n=20) mean	10000 ppm (n=20) mean		
Proprioception	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		
Air righting reflex	Pre	1.00	1.00	1.00	1.00	n/a	
	2	1.00	1.00	1.00	1.00		
	4	1.00	1.00	1.00	1.00		
	8	1.00	1.00	1.00	1.00		
	13	1.00	1.00	1.00	1.00		

n = number of animals

p values from the GENMOD analysis

n/a = not analyzed due to an insufficient number of non-normal findings

Males	Mean Motor Activity Values (number of beam breaks) Pretest	Table 9
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[illegible]

Females	Mean Motor Activity Values (number of beam breaks) Pretest	Table 9
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[illegible]

Males	Mean Motor Activity Values (number of beam breaks) Week 2	Table 9
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[illegible]

Females	Mean Motor Activity Values (number of beam breaks) Week 2	Table 9
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[illegible]

Males	Mean Motor Activity Values (number of beam breaks) Week 4	Table 9
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[illegible]

Females	Mean Motor Activity Values (number of beam breaks) Week 4	Table 9
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[illegible]

Males	Mean Motor Activity Values (number of beam breaks) Week 8	Table 9
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[illegible]

Females	Mean Motor Activity Values (number of beam breaks) Week 8	Table 9
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[illegible]

Males	Mean Motor Activity Values (number of beam breaks) Week 13	Table 9
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[illegible]

Females	Mean Motor Activity Values (number of beam breaks) Week 13	Table 9
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[illegible]

Males	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	227.3	224.9	224.7	226.6
	S.D.	19.7	17.9	10.1	12.2
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	903.8	856.8	835.5	886.3
	S.D.	61.5	89.0	123.6	61.8
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	474.5	497.0	493.3	510.8
	S.D.	134.8	76.5	73.3	68.8
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.5	7.4	7.4	7.3
	S.D.	1.2	1.1	1.2	1.4
	N	10	10	10	10
Body Temperature (°C)	Mean	37.9	38.0	37.9	37.6
	S.D.	0.7	0.6	0.6	0.7
	N	10	10	10	10

Males	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	10	10	9	10
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	0	1	0
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	9	10
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	1	0
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	9	8	6	7
	Easy	1	2	4	3
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body				
	Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	0	0	0	0
	Alert, displays exploratory behavior	10	10	10	10
	High, slight excitement, tense sudden darting or freezing	0	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	10	10	10	10
	Present	0	0	0	0
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	13	1	6	1
	Unformed Stool	0	0	0	0
Urine	Number of Pools	7	6	18	3
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	183.1	182.7	182.9	179.6
	S.D.	10.3	10.3	13.1	12.9
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	816.8	761.8	769.5	832.3
	S.D.	89.2	116.2	82.9	109.0
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	531.0	547.0	485.3	466.8
	S.D.	77.1	141.5	93.3	79.4
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	6.9	6.3	6.3	5.7
	S.D.	1.7	1.4	1.4	1.0
	N	10	10	10	10
Body Temperature (°C)	Mean	38.0	38.1	38.4	38.2
	S.D.	0.5	0.6	0.6	0.6
	N	10	10	10	10

Females	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	10	10	8	10
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	0	2	0
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	8	10
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	2	0
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	7	9	9	8
	Easy	3	1	1	2
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Pretest	Table 10
	Exposure Level (ppm):	
	Group 1 0	Group 2 1000
	Group 3 5000	Group 4 10000
Number of Animals Examined	10	10
Open Field Evaluations (cont.)		
Arousal	Very low, stupor, little or no responsiveness to environment	0 0 0 0
	Moderately low; slight stupor	0 0 0 0
	Slightly low; slightly sluggish, some exploratory behavior	0 0 0 0
	Alert, displays exploratory behavior	10 10 10 10
	High, slight excitement, tense sudden darting or freezing	0 0 0 0
	Very High; hyperalert, sudden bouts of running or movement	0 0 0 0
Piloerection	Not Present	10 10 10 10
	Present	0 0 0 0
Exophthalmia	Not Present	10 10 10 10
	Present	0 0 0 0
Feces	Number of Boluses	0 0 0 0
	Unformed Stool	0 0 0 0
Urine	Number of Pools	0 1 0 3
	Polyuria	0 0 0 0
Motor Movements		
Fasciculations	Not Present	10 10 10 10
	Present	0 0 0 0
Convulsions	Not Present	10 10 10 10
	Present	0 0 0 0
Tremors	Not Present	10 10 10 10
	Present	0 0 0 0

Females	Summary of Functional Observational Battery Evaluation Pretest	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	333.3	336.6	331.0	334.2
	S.D.	31.2	38.4	17.6	17.7
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	1123.0	1025.0	1067.3	1116.0
	S.D.	201.7	110.2	125.9	120.7
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	678.3	736.3	585.5	644.3
	S.D.	140.1	131.3	143.8	109.4
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.6	7.5	7.5	6.9
	S.D.	1.0	1.2	1.2	1.4
	N	10	10	10	10
Body Temperature (°C)	Mean	37.0	36.7	36.9	37.3
	S.D.	0.6	0.8	0.6	0.8
	N	10	10	10	10

Males	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	10	9	8	6
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	1	2	4
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	9	8	6
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	1	2	4
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	10	9	9	9
	Easy	0	1	1	1
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)		10	9	9	9
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	2	0	2	1
	Alert, displays exploratory behavior	7	10	8	9
	High, slight excitement, tense sudden darting or freezing	1	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	2	0	1	1
	Present	8	10	9	9
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	19	11	18	10
	Unformed Stool	0	0	0	0
Urine	Number of Pools	11	10	14	1
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		0	1000	5000	10000
Body Weight (g)	Mean	238.8	236.3	235.8	228.5
	S.D.	10.9	12.1	16.8	13.4
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	1113.5	967.3	986.3	1034.0
	S.D.	57.0	184.3	181.9	144.0
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	718.0	650.5	671.3	594.5
	S.D.	149.2	95.7	123.8	145.8
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.4	6.4	5.9	5.8
	S.D.	0.7	1.7	0.9	0.7
	N	10	10	10	10
Body Temperature (°C)	Mean	37.9	38.1	38.3	38.0
	S.D.	0.7	0.7	0.6	0.8
	N	10	10	10	10

Females	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	9	10	10	10
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	1	0	0	0
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	9	10	10	10
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	1	0	0	0
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	9	10	8	10
	Easy	1	0	2	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	0	0	0	0
	Alert, displays exploratory behavior	9	9	8	10
	High, slight excitement, tense sudden darting or freezing	1	1	2	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	9	6	9	8
	Present	1	4	1	2
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	0	0	0	0
	Unformed Stool	0	0	0	0
Urine	Number of Pools	0	0	0	0
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 2	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on Back	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	395.7	402.9	393.2	398.0
	S.D.	43.8	49.9	24.2	27.7
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	933.5	883.8	946.0	1127.8
	S.D.	182.2	228.3	141.2	151.5
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	730.0	702.0	598.3	692.5
	S.D.	169.4	222.5	136.7	140.8
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.3	6.9	7.2	7.1
	S.D.	0.8	1.1	1.6	1.5
	N	10	10	10	10
Body Temperature (°C)	Mean	36.0	36.4	36.1	36.6
	S.D.	0.6	1.0	0.9	0.8
	N	10	10	10	10

Males	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	10	10	10	10
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	0	0	0
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	10	10
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	0	0
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	10	8	9	10
	Easy	0	2	1	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	9	10	10	10
	Present	1	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	2	1	3	1
	Alert, displays exploratory behavior	8	9	7	9
	High, slight excitement, tense sudden darting or freezing	0	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	0	2	4	2
	Present	10	8	6	8
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	13	8	13	20
	Unformed Stool	0	0	0	0
Urine	Number of Pools	22	13	26	15
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	270.4	266.5	264.6	259.6
	S.D.	15.2	8.6	16.2	13.7
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	937.8	832.3	953.8	773.5
	S.D.	195.2	189.3	195.7	224.9
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	645.3	637.0	719.8	675.0
	S.D.	116.7	108.0	222.6	188.5
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	6.9	6.1	6.4	6.1
	S.D.	1.3	1.2	1.1	0.9
	N	10	10	10	10
Body Temperature (°C)	Mean	36.8	37.5	37.7	37.9
	S.D.	0.7	1.1	0.8	0.6
	N	10	10	10	10

Females	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	9	10	10	9
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	2	0	0	1
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	10	9
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	0	1
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	10	10	9	10
	Easy	0	0	1	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	9	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	1 ^a	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
	No impairment, animal moves easily around open field	10	10	10	10
Locomotion	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

^a Slightly splayed

Females	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	0	0	0	0
	Alert, displays exploratory behavior	9	10	10	10
	High, slight excitement, tense sudden darting or freezing	1	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	6	5	7	6
	Present	4	5	3	4
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	0	0	0	0
	Unformed Stool	0	0	0	0
Urine	Number of Pools	0	0	0	0
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 4	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on Back	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	475.8	481.5	461.9	470.6
	S.D.	54.3	60.0	26.2	45.6
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	963.5	970.3	1110.8	1291.5
	S.D.	276.9	234.5	329.9	356.8
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	668.0	793.5	750.8	808.0
	S.D.	168.3	178.5	191.3	156.6
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.0	6.4	6.5	6.8
	S.D.	0.9	0.7	1.4	1.4
	N	10	10	10	10
Body Temperature (°C)	Mean	37.2	37.5	36.9	36.7
	S.D.	1.0	1.0	0.9	0.6
	N	10	10	10	10

Males	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	9	10	9	9
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	1	0	1	1
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	9	10	9	8
	Eyelids slightly drooping	0	0	0	1
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	1	0	1	1
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	10	9	9	10
	Easy	0	1	1	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	9	10	10	10
	Present	1	0	0	0
Lacrimation	No lacrimation	9	10	10	10
	Moderate lacrimation	1	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	4	2	1	3
	Alert, displays exploratory behavior	6	8	9	7
	High, slight excitement, tense sudden darting or freezing	0	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	4	3	7	3
	Present	6	7	3	7
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	21	15	16	9
	Unformed Stool	0	0	0	0
Urine	Number of Pools	19	13	27	42
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	299.9	302.5	294.1	287.7
	S.D.	21.7	17.7	17.3	18.7
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	1077.8	888.5	972.0	953.0
	S.D.	95.7	242.6	210.3	263.8
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	669.3	685.3	667.5	632.3
	S.D.	202.1	165.5	161.5	111.7
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	6.7	5.6	5.9	6.2
	S.D.	1.0	1.2	1.4	0.8
	N	10	10	10	10
Body Temperature (°C)	Mean	37.5	37.9	37.7	37.5
	S.D.	1.0	0.9	1.0	0.9
	N	10	10	10	10

Females	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	8	9	10	8
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	2	1	0	2
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	8	9	10	8
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	2	1	0	2
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	8	10	9	10
	Easy	2	0	1	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	10	10	10	10
	Moderately low; slight resistance to being handled	0	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	10
	Present	0	0	0	0
Lacrimation	No lacrimation	10	10	10	10
	Moderate lacrimation	0	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	9	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	1 ^a	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

^a Slightly splayed

Females	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	0	1	1	0
	Alert, displays exploratory behavior	10	9	9	10
	High, slight excitement, tense sudden darting or freezing	0	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	7	8	8	5
	Present	3	2	2	5
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	0	1	0	3
	Unformed Stool	0	0	0	0
Urine	Number of Pools	0	5	0	9
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 8	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on Back	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	516.0	538.6	511.2	525.0
	S.D.	61.2	72.8	27.8	55.0
	N	10	10	10	10
Forelimb Grip Strength (g)	Mean	1121.0	1073.0	1339.3	1361.5
	S.D.	155.8	211.9	238.4	251.1
	N	10	10	10	10
Hindlimb Grip Strength (g)	Mean	720.8	635.0	751.8	783.8
	S.D.	155.7	162.2	212.0	105.6
	N	10	10	10	10
Landing Foot Splay (cm)	Mean	7.0	6.8	6.5	6.7
	S.D.	1.1	0.9	1.9	1.7
	N	10	10	10	10
Body Temperature (°C)	Mean	36.6	37.0	36.7	36.9
	S.D.	1.0	1.0	0.8	1.0
	N	10	10	10	10

Males	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations					
Posture	Sitting or standing	10	10	10	10
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	0	0	0
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	10
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	10	10
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	0	0
Motor Movement	No abnormal movements	10	10	10	10
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations		9	10	10	10
Ease of Removal	Very easy	1	0	0	0
	Easy	0	0	0	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	9	10	10	10
	Moderately low; slight resistance to being handled	1	0	0	0
	Moderately high; rat may freeze, be tense or rigid in hand	0	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Home Cage Evaluations (cont.)					
Chromodacryorrhea	Not Present	9	10	10	10
	Present	1	0	0	0
Lacrimation	No lacrimation	9	10	10	10
	Moderate lacrimation	1	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	10
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	10
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	10
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	10
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	10
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	3	2	1	0
	Alert, displays exploratory behavior	7	8	9	10
	High, slight excitement, tense sudden darting or freezing	0	0	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	7	6	7	8
	Present	3	4	3	2
Exophthalmia	Not Present	10	10	10	10
	Present	0	0	0	0
Feces	Number of Boluses	18	19	9	13
	Unformed Stool	0	0	0	0
Urine	Number of Pools	3	4	27	44
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	10
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	10
	Present	0	0	0	0
Tremors	Not Present	10	10	10	10
	Present	0	0	0	0

Males	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	10
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	10
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	10
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	10
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	10
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	10
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	10
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	10
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on back	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Body Weight (g)	Mean	316.4	321.0	309.7	305.8
	S.D.	28.7	18.8	26.9	18.8
	N	10	10	10	9
Forelimb Grip Strength (g)	Mean	1058.3	797.8	875.3	1078.1
	S.D.	211.8	217.9	206.1	153.0
	N	10	10	10	9
Hindlimb Grip Strength (g)	Mean	647.0	652.3	676.0	626.1
	S.D.	171.2	162.3	170.2	192.1
	N	10	10	10	9
Landing Foot Splay (cm)	Mean	5.8	5.8	6.1	5.9
	S.D.	1.0	1.4	1.2	0.9
	N	10	10	10	9
Body Temperature (°C)	Mean	37.5	37.4	37.8	37.8
	S.D.	1.0	0.9	0.7	0.8
	N	10	10	10	9

Females	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	9
Home Cage Evaluations					
Posture	Sitting or standing	10	10	10	8
	Rearing; standing on hind limbs	0	0	0	0
	Asleep	0	0	0	1
	Lying on side, limbs in the air	0	0	0	0
	Flattened, limbs may be spread	0	0	0	0
	Crouched	0	0	0	0
Vocalizations	No vocalizations present	10	10	10	9
	Vocalization present	0	0	0	0
Palpebral Closure	Eyelids open	10	10	10	8
	Eyelids slightly drooping	0	0	0	0
	Eyelids half closed	0	0	0	0
	Eyelids completely closed	0	0	0	1
Motor Movement	No abnormal movements	10	10	10	9
	Tremors	0	0	0	0
	Fasciculations	0	0	0	0
	Convulsions	0	0	0	0
	Stereotypy	0	0	0	0
	Other	0	0	0	0
Handling Evaluations					
Ease of Removal	Very easy	9	10	8	9
	Easy	1	0	2	0
	Slightly difficult	0	0	0	0
	Freezes or flinches	0	0	0	0
	Moderately difficult	0	0	0	0
	Very Difficult	0	0	0	0
Reactivity to Handling	Low; no resistance, rat is easy to handle	9	10	9	9
	Moderately low; slight resistance to being handled	0	0	1	0
	Moderately high; rat may freeze, be tense or rigid in hand	1	0	0	0
	High; squirms or twists, attempts to bite	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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Exposure Level (ppm):		Group 1 0	Group 2 1000	Group 3 5000	Group 4 10000
Number of Animals Examined		10	10	10	9
Handling Evaluations (cont.)					
Chromodacryorrhea	Not Present	10	10	10	9
	Present	0	0	0	0
Lacrimation	No lacrimation	9	10	10	9
	Moderate lacrimation	1	0	0	0
	Extreme lacrimation	0	0	0	0
Coat	Normal; well groomed	10	10	10	9
	Slightly soiled	0	0	0	0
	Moderately soiled	0	0	0	0
	Extremely soiled; crusty, unkempt	0	0	0	0
Salivation	Not present	10	10	10	9
	Slight salivation	0	0	0	0
	Moderate salivation	0	0	0	0
	Extreme salivation	0	0	0	0
Open Field Evaluations					
Gait and Posture	No abnormal gait or posture	10	10	10	9
	Ataxia	0	0	0	0
	Hindlimbs Splayed or Drag	0	0	0	0
	Forelimbs Drag	0	0	0	0
	Walks on Tip Toes	0	0	0	0
	Hunched or Crouched Body Position	0	0	0	0
	Body Drags or is Flattened	0	0	0	0
Locomotion	No impairment, animal moves easily around open field	10	10	10	9
	Slightly impaired; moves slowly, deliberate movements	0	0	0	0
	Moderately impaired; moves sluggish and with hesitation, may require gentle prodding	0	0	0	0
	Severely impaired; animal doesn't move around field even after gentle prodding	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	9
Open Field Evaluations (cont.)					
Arousal	Very low, stupor, little or no responsiveness to environment	0	0	0	0
	Moderately low; slight stupor	0	0	0	0
	Slightly low; slightly sluggish, some exploratory behavior	2	0	0	0
	Alert, displays exploratory behavior	8	9	10	9
	High, slight excitement, tense sudden darting or freezing	0	1	0	0
	Very High; hyperalert, sudden bouts of running or movement	0	0	0	0
Piloerection	Not Present	8	8	10	7
	Present	2	2	0	2
Exophthalmia	Not Present	10	10	10	9
	Present	0	0	0	0
Feces	Number of Boluses	0	3	0	8
	Unformed Stool	0	0	0	0
Urine	Number of Pools	0	3	1	5
	Polyuria	0	0	0	0
Motor Movements					
Fasciculations	Not Present	10	10	10	9
	Present	0	0	0	0
Convulsions	Not Present	10	10	10	9
	Present	0	0	0	0
Tremors	Not Present	10	10	10	9
	Present	0	0	0	0

Females	Summary of Functional Observational Battery Evaluation Week 13	Table 10
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		Group 1	Group 2	Group 3	Group 4
Exposure Level (ppm):		0	1000	5000	10000
Number of Animals Examined		10	10	10	9
Reflex Assessments					
Visual Approach	No reaction	0	0	0	0
	Slowly approaches, sniffs and/or turns away	10	10	10	9
	Freezes or pulls away slightly	0	0	0	0
	Jumps or turns abruptly to avoid	0	0	0	0
	Attacks and/or bites	0	0	0	0
Audition	No reaction	0	0	0	0
	Slight reaction, some evidence that noise was heard	0	0	0	0
	Flinches and/or flicks ears	10	10	10	9
	Exaggerated; jumps, flips, bites	0	0	0	0
Pain	No reaction	0	0	0	0
	Turns towards site, walks forward or vocalizes	10	10	10	9
	Rat flinches, muscle contractions are present	0	0	0	0
	Exaggerated reaction; jumps, bites, attacks	0	0	0	0
Pupil Response	Pupil constricts normally	10	10	10	9
	Pupil size does not change	0	0	0	0
	Miosis	0	0	0	0
	Mydriasis	0	0	0	0
Pinna	Ear flattens against head	10	10	10	9
	No response	0	0	0	0
Proprioception	Returns leg to original position	10	10	10	9
	Returns leg only partially to original position	0	0	0	0
	No response, rat allows leg to remain pulled back	0	0	0	0
Air Righting Reflex	Normal, lands on all four feet	10	10	10	9
	Slightly uncoordinated	0	0	0	0
	Lands on side	0	0	0	0
	Lands on Back	0	0	0	0

	Mean Hematology Values Preface	Table 11
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Abbreviation	Parameter	Reporting Units
HGB	Hemoglobin Concentration	g/dL
HCT	Hematocrit	percent
RBC	Erythrocyte Count	$10^6/\mu\text{L}$
RDW	Red Cell Distribution Width	%
RETIC	Absolute Reticulocyte Count	$10^9/\text{L}$
PLT	Platelet Count	$10^3/\mu\text{L}$
MPV	Mean Platelet Volume	fL
MCV	Mean Corpuscular Volume	fL
MCH	Mean Corpuscular Hemoglobin	pg
MCHC	Mean Corpuscular Hemoglobin Concentration	g/dL
WBC	Total Leukocyte Count	$10^3/\mu\text{L}$
ANEU	Absolute Neutrophils	$10^3/\mu\text{L}$
ALYM	Absolute Lymphocytes	$10^3/\mu\text{L}$
AMONO	Absolute Monocytes	$10^3/\mu\text{L}$
AEOS	Absolute Eosinophils	$10^3/\mu\text{L}$
ABASO	Absolute Basophils	$10^3/\mu\text{L}$
ALUC	Absolute Large Unstained Cells	$10^3/\mu\text{L}$

Key to Statistical Symbols:

*Significantly different from control mean; $p \leq 0.05$.

**Significantly different from control mean; $p \leq 0.01$.

If no asterisks, no statistically significant differences from control mean.

Mean Hematology Values - Termination

[illegible]

Huntingdon Life Sciences Study No. 03-6141

Table 11

Mean Hematology Values - Termination

Group		RDW	WBC	ANEU	ALYM	AMONO	AEOS	ABASO	ALUC
		%	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL
1M									
0 ppm	Mean	13.5	13.30	1.65	11.01	0.28	0.13	0.13	0.10
	SD	0.39	5.016	0.390	4.675	0.096	0.041	0.091	0.067
	n	10	10	10	10	10	10	10	10
2M									
1000 ppm	Mean	13.7	11.65	2.39	8.68	0.28	0.14	0.09	0.07
	SD	0.22	2.228	2.437	2.412	0.095	0.058	0.033	0.018
	n	10	10	10	10	10	10	10	10
3M									
5000 ppm	Mean	13.2	10.46	1.61	8.34	0.24	0.12	0.08	0.07
	SD	0.61	1.379	0.428	1.541	0.057	0.078	0.018	0.021
	n	10	10	10	10	10	10	10	10
4M									
10000 ppm	Mean	13.3	11.93	1.65	9.69	0.27	0.17	0.10	0.06
	SD	0.54	3.403	0.663	2.888	0.125	0.065	0.056	0.036
	n	10	10	10	10	10	10	10	10

Mean Hematology Values - Termination

[illegible]

Huntingdon Life Sciences Study No. 03-6141

Table 11

Mean Hematology Values - Termination

Group		RDW	WBC	ANEU	ALYM	AMONO	AEOS	ABASO	ALUC
		%	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL	x10 ³ /uL
1F									
0 ppm	Mean	12.8	11.16	1.49	9.09	0.32	0.13	0.08	0.06
	SD	0.40	1.972	0.560	1.621	0.106	0.043	0.041	0.030
	n	10	10	10	10	10	10	10	9
2F			*		*				
1000 ppm	Mean	12.9	9.20	1.30	7.38	0.28	0.11	0.07	0.05
	SD	0.45	2.107	0.427	1.919	0.112	0.060	0.028	0.027
	n	10	10	10	10	10	10	10	10
3F			**		**	*			
5000 ppm	Mean	12.9	7.63	1.25	5.94	0.20	0.16	0.05	0.04
	SD	0.52	2.073	0.563	1.607	0.068	0.089	0.025	0.010
	n	10	10	10	10	10	10	10	10
4F			**		**	*			
10000 ppm	Mean	12.9	9.51	1.64	7.36	0.24	0.14	0.06	0.06
	SD	0.36	1.751	0.685	1.837	0.073	0.055	0.017	0.020
	n	9	9	9	9	9	9	9	9

	Mean Coagulation Values Preface	Table 12
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Abbreviation	Parameter	Reporting Units
PT	Prothrombin Time	seconds
APTT	Activated Partial Thromboplastin Time	seconds

Key to Statistical Symbols:

*Significantly different from control mean; $p \leq 0.05$.

**Significantly different from control mean; $p \leq 0.01$.

If no asterisks, no statistically significant differences from control mean.

Huntingdon Life Sciences Study No. 03-6141

Table 12

Mean Coagulation Values - Termination

Group		PT	APTT
		Seconds	Seconds
1M			
0 ppm	Mean	14.6	18.7
	SD	1.03	3.12
	n	10	9
2M			
1000 ppm	Mean	14.2	19.3
	SD	0.81	4.51
	n	9	8
3M			
5000 ppm	Mean	14.6	18.5
	SD	0.61	3.79
	n	10	10
4M			
10000 ppm	Mean	14.4	17.1
	SD	0.45	2.69
	n	10	10

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Table 12

Mean Coagulation Values - Termination

Group		PT	APTT
		Seconds	Seconds
1F			
0 ppm	Mean	14.0	15.5
	SD	0.54	2.32
	n	10	10
2F			
1000 ppm	Mean	13.9	15.0
	SD	0.38	2.91
	n	10	10
3F			
5000 ppm	Mean	14.3	15.9
	SD	0.59	2.89
	n	10	10
4F			
10000 ppm	Mean	14.2	14.6
	SD	0.50	3.60
	n	9	9

	Mean Clinical Chemistry Values Preface	Table 13
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Abbreviation	Parameter	Reporting Units
AST	Aspartate Aminotransferase	U/L
ALT	Alanine Aminotransferase	U/L
ALKP	Alkaline Phosphatase	U/L
LD	Lactate Dehydrogenase	U/L
BUN	Blood Urea Nitrogen	mg/dL
CREAT	Creatinine	mg/dL
GLU	Fasting Glucose	mg/dL
CK	Creatine Kinase	U/L
CHOL	Cholesterol (Enzymatic)	mg/dL
TRIG	Triglycerides	mg/dL
TP	Total Protein	g/dL
ALB	Albumin	g/dL
Glob	Globulin (calculated)	g/dL
A/G	Albumin/Globulin Ratio (calculated)	
TBILI	Total Bilirubin	mg/dL
DBILI	Direct Bilirubin	mg/dL
IBILI	Indirect Bilirubin	mg/dL
Na ⁺	Sodium	mEq/L
K ⁺	Potassium	mEq/L
Cl ⁻	Chloride	mEq/L
Ca ⁺⁺	Calcium	mg/dL
PHOS	Inorganic Phosphorus	mg/dL
GGT	Gamma-Glutamyl Transferase	U/L

Key to Statistical Symbols:

*Significantly different from control mean; $p \leq 0.05$.

**Significantly different from control mean; $p \leq 0.01$.

If no asterisks, no statistically significant differences from control mean.

Note: No data is presented for GGT when all values were below the limit of quantification.

Mean Clinical Chemistry Values - Termination

[illegible]

Table 13

Mean Clinical Chemistry Values - Termination

[illegible]

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Table 13

Mean Clinical Chemistry Values - Termination

Group		K+	Cl-	Ca++	PHOS
		mEq/L	mEq/L	mg/dL	mg/dL
1M					
0 ppm	Mean	5.6	103	11.3	8.7
	SD	0.63	1.6	0.47	0.93
	n	10	10	10	10
2M					
1000 ppm	Mean	5.8	103	11.2	8.5
	SD	0.60	1.3	0.34	0.92
	n	10	10	10	10
3M					
5000 ppm	Mean	5.7	104	11.5	8.4
	SD	0.46	1.2	0.43	1.26
	n	10	10	10	10
4M					
10000 ppm	Mean	*	104	11.4	9.4
	SD	0.51	1.2	0.36	0.99
	n	10	10	10	10

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Table 13

Mean Clinical Chemistry Values - Termination

Group		K+	Cl-	Ca++	PHOS
		mEq/L	mEq/L	mg/dL	mg/dL
1F					
0 ppm	Mean	5.7	103	11.8	7.5
	SD	0.52	2.0	0.27	0.96
	n	10	10	10	10
2F					
1000 ppm	Mean	6.0	103	11.8	7.1
	SD	0.56	1.1	0.31	0.76
	n	10	10	10	10
3F					
5000 ppm	Mean	5.9	103	11.9	7.1
	SD	0.86	1.7	0.37	0.91
	n	10	10	10	10
4F					
10000 ppm	Mean	5.5	104	11.5	6.8
	SD	0.63	1.1	0.42	0.96
	n	9	9	9	9

	Mean Organ Weights Preface	Table 14
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Neurotoxicity Animals

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Key to Abbreviations:

g	=	Grams
wt.	=	Weight
observ.	=	Observed
Thyroid/Para	=	Thyroid/Parathyroid Gland

Corresponding target exposure levels for each group were as follows:

Group 1	-	0 ppm
Group 2	-	1000 ppm
Group 3	-	5000 ppm
Group 4	-	10000 ppm

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Epididymides	Heart	Kidneys	Liver	Lungs
			M a l e	A n i m a l s				
1								
Mean:	506.2	0.0632	2.2092	1.5880	1.6227	3.9000	13.8516	1.9799
Standard deviation:	59.5	0.0071	0.1094	0.2477	0.1816	0.4392	2.1553	0.2238
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
Mean:	489.1	0.0681	2.1452	1.5533	1.5372	3.7377	13.5725	1.9922
Standard deviation:	61.7	0.0109	0.0941	0.1376	0.2212	0.2627	1.7383	0.2027
Number of observ. :	(10)	(9)	(9)	(10)	(9)	(9)	(9)	(9)
3								
Mean:	475.7	0.0616	2.1305	1.4441	1.4370	3.4640*	12.1727	1.9574
Standard deviation:	34.0	0.0115	0.0592	0.1406	0.1050	0.2668	0.8223	0.1848
Number of observ. :	(10)	(9)	(9)	(10)	(9)	(9)	(9)	(9)
4								
Mean:	501.9	0.0671	2.1782	1.4785	1.6026	3.6858	13.0782	2.1122
Standard deviation:	50.0	0.0127	0.1152	0.1439	0.2372	0.4788	1.8898	0.3253
Number of observ. :	(10)	(10)	(9)	(10)	(9)	(9)	(9)	(9)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
% (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Pituitary gland	Prostate Seminal vesicles	Spleen	Testes	Thymus	Thyroid/Para
Male Animals							
1							
Mean:	506.2	0.0115	1.1545	2.0849	0.8145	3.6461	0.4182
Standard deviation:	59.5	0.0024	0.2125	0.5311	0.1326	0.2340	0.1384
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2							
Mean:	489.1	0.0113	1.1104	2.0165	0.7422	3.3190	0.3439
Standard deviation:	61.7	0.0019	0.2284	0.2725	0.1539	0.5575	0.0968
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)
3							
Mean:	475.7	0.0108	1.0574	1.7848	0.7259	3.4278	0.3052*
Standard deviation:	34.0	0.0011	0.2312	0.3746	0.1426	0.3403	0.0306
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)
4							
Mean:	501.9	0.0104	1.0724	1.9282	0.8389	3.4662	0.3231
Standard deviation:	50.0	0.0016	0.1568	0.3443	0.1720	0.3323	0.0793
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
% (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Heart	Kidneys	Liver	Lungs	Ovaries

F e m a l e A n i m a l s								
1								
M e a n:	298.0	0.0696	2.0342	1.0422	2.1276	7.8399	1.5905	0.1061
Standard deviation:	24.1	0.0237	0.0569	0.0865	0.1959	0.5305	0.1191	0.0367
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	293.1	0.0787	1.9789	1.1100	2.2665	8.2201	1.6333	0.0989
Standard deviation:	19.7	0.0107	0.0874	0.1026	0.0932	0.6765	0.1248	0.0269
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
3								
M e a n:	286.0	0.0765	2.0491	1.0713	2.1656	8.0124	1.6443	0.0934
Standard deviation:	34.0	0.0148	0.1373	0.1447	0.2092	1.1661	0.4334	0.0255
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
4								
M e a n:	279.1	0.0742	2.0651	0.9823	2.0892	7.4906	1.4937	0.0957
Standard deviation:	11.7	0.0114	0.0897	0.1333	0.2258	0.4194	0.1791	0.0217
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Pituitary gland	Spleen	Thymus	Thyroid/Para	Uterus

			F e m a l e	A n i m a l s		
1						
M e a n:	298.0	0.0150	0.5836	0.3412	0.0307	0.6625
Standard deviation:	24.1	0.0037	0.0569	0.0697	0.0055	0.1697
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)
2						
M e a n:	293.1	0.0168	0.5634	0.2688	0.0328	0.7421
Standard deviation:	19.7	0.0024	0.0759	0.0548	0.0040	0.2421
Number of observ. :	(10)	(9)	(9)	(9)	(10)	(9)
3						
M e a n:	286.0	0.0165	0.5350	0.2600*	0.0305	0.7511
Standard deviation:	34.0	0.0030	0.0834	0.0848	0.0048	0.2684
Number of observ. :	(10)	(9)	(9)	(9)	(10)	(9)
4						
M e a n:	279.1	0.0154	0.5121	0.3249	0.0335	0.7735
Standard deviation:	11.7	0.0020	0.0779	0.0605	0.0053	0.2465
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Epididymides	Heart	Kidneys	Liver	Lungs

			M a l e	A n i m a l s				
1								
M e a n:	506.2	0.0126	0.4408	0.3133	0.3224	0.7725	2.7288	0.3937
Standard deviation:	59.5	0.0013	0.0442	0.0238	0.0335	0.0505	0.1862	0.0436
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	489.1	0.0138	0.4377	0.3215	0.3115	0.7603	2.7551	0.4038
Standard deviation:	61.7	0.0016	0.0443	0.0464	0.0358	0.0627	0.3353	0.0259
Number of observ. :	(10)	(9)	(9)	(10)	(9)	(9)	(9)	(9)
3								
M e a n:	475.7	0.0131	0.4543	0.3052	0.3060	0.7367	2.5876	0.4155
Standard deviation:	34.0	0.0024	0.0349	0.0376	0.0265	0.0507	0.1356	0.0282
Number of observ. :	(10)	(9)	(9)	(10)	(9)	(9)	(9)	(9)
4								
M e a n:	501.9	0.0134	0.4386	0.2966	0.3203	0.7371	2.6155	0.4239
Standard deviation:	50.0	0.0024	0.0407	0.0357	0.0346	0.0580	0.2851	0.0661
Number of observ. :	(10)	(10)	(9)	(10)	(9)	(9)	(9)	(9)

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Group	Terminal Body wt. (g)	Pituitary gland	Prostate Seminal vesicles	Spleen	Testes	Thymus Thyroid/Para		

			M a l e	A n i m a l s				
1								
M e a n:	506.2	0.0023	0.2300	0.4135	0.1603	0.7263	0.0811	0.0086
Standard deviation:	59.5	0.0004	0.0472	0.1050	0.0114	0.0652	0.0198	0.0019
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	489.1	0.0023	0.2252	0.4124	0.1490	0.6934	0.0687	0.0093
Standard deviation:	61.7	0.0003	0.0438	0.0748	0.0167	0.1511	0.0133	0.0018
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)	(10)
3								
M e a n:	475.7	0.0023	0.2265	0.3802	0.1534	0.7270	0.0652	0.0083
Standard deviation:	34.0	0.0002	0.0559	0.0807	0.0225	0.1111	0.0094	0.0012
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)	(10)
4								
M e a n:	501.9	0.0021	0.2155	0.3905	0.1672	0.6953	0.0650	0.0080
Standard deviation:	50.0	0.0003	0.0320	0.0878	0.0272	0.0832	0.0168	0.0014
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(10)	(9)	(10)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Heart	Kidneys	Liver	Lungs	Ovaries

			F e m a l e	A n i m a l s				
1								
M e a n:	298.0	0.0235	0.6865	0.3514	0.7164	2.6365	0.5352	0.0360
Standard deviation:	24.1	0.0089	0.0561	0.0363	0.0708	0.1456	0.0378	0.0141
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	293.1	0.0273	0.6874	0.3855	0.7879	2.8570	0.5683	0.0345
Standard deviation:	19.7	0.0034	0.0211	0.0321	0.0380	0.2469	0.0525	0.0102
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
3								
M e a n:	286.0	0.0269	0.7279	0.3780	0.7687	2.8243	0.5760	0.0326
Standard deviation:	34.0	0.0031	0.0577	0.0255	0.0736	0.2077	0.1081	0.0060
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
4								
M e a n:	279.1	0.0267	0.7417	0.3531	0.7501	2.6875	0.5353	0.0345
Standard deviation:	11.7	0.0045	0.0558	0.0544	0.0901	0.1820	0.0624	0.0084
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
% (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Pituitary gland	Spleen	Thymus	Thyroid/Para	Uterus

			F e m a l e	A n i m a l s		
1						
M e a n:	298.0	0.0051	0.1976	0.1142	0.0104	0.2223
Standard deviation:	24.1	0.0013	0.0297	0.0202	0.0021	0.0533
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)
2						
M e a n:	293.1	0.0059	0.1955	0.0937	0.0112	0.2561
Standard deviation:	19.7	0.0008	0.0235	0.0210	0.0016	0.0781
Number of observ. :	(10)	(9)	(9)	(9)	(10)	(9)
3						
M e a n:	286.0	0.0059	0.1893	0.0900*	0.0107	0.2725
Standard deviation:	34.0	0.0010	0.0229	0.0204	0.0014	0.1136
Number of observ. :	(10)	(9)	(9)	(9)	(10)	(9)
4						
M e a n:	279.1	0.0056	0.1843	0.1164	0.0120	0.2769
Standard deviation:	11.7	0.0008	0.0322	0.0214	0.0019	0.0853
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Epididymides	Heart	Kidneys	Liver	Lungs

			M a l e	A n i m a l s				
1								
M e a n:	506.2	2.8586	100.0000	71.8144	73.5882	176.3768	625.7269	89.5090
Standard deviation:	59.5	0.2376	0.0000	10.0416	8.9714	16.1717	83.1844	7.5565
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	489.1	3.1770	100.0000	73.1149	71.6121	174.5120	633.8105	92.9077
Standard deviation:	61.7	0.5049	0.0000	6.2672	9.0383	14.0120	85.0040	9.0223
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
3								
M e a n:	475.7	2.8994	100.0000	67.3650	67.5295	162.8173	572.0472	92.0666
Standard deviation:	34.0	0.5753	0.0000	6.4417	5.8097	14.7076	45.7402	10.1734
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
4								
M e a n:	501.9	3.1377	100.0000	67.2199	73.5219	169.2165	600.5063	96.9489
Standard deviation:	50.0	0.4658	0.0000	4.7408	9.5169	19.3020	80.8339	13.6020
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Terminal Sacrifice									
Group	Terminal Body wt. (g)	Pituitary gland	Prostate Seminal vesicles	Spleen	Testes	Thymus	Thyroid/Para		

M a l e A n i m a l s									
1									
M e a n:	506.2	0.5198	52.1892	94.3885	36.7714	165.3188	18.8883	1.9626	
Standard deviation:	59.5	0.0862	8.8180	24.2145	5.0086	12.5108	6.0887	0.3742	
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)	
2									
M e a n:	489.1	0.5297	51.7610	94.1264	34.6168	154.1963	15.9311	2.0672	
Standard deviation:	61.7	0.0912	10.5052	13.2121	7.0156	27.3149	4.0087	0.3847	
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	
3									
M e a n:	475.7	0.5063	49.5978	83.8909	34.0568	163.0795	14.3350%	1.8598	
Standard deviation:	34.0	0.0507	10.5922	18.0683	6.5035	14.3381	1.4695	0.2180	
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	
4									
M e a n:	501.9	0.4795	49.3791	88.4049	38.3973	156.5588	14.8395	1.8198	
Standard deviation:	50.0	0.0726	7.8272	14.4616	6.8353	10.7166	3.6108	0.4204	
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)	

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Terminal Sacrifice

Summary Statistics for % Organ to Brain Weight
Study number: 036141

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Group	Terminal Body wt. (g)	Adrenal Glands	Brain	Heart	Kidneys	Liver	Lungs	Ovaries

F e m a l e A n i m a l s								
1								
M e a n:	298.0	3.4093	100.0000	51.2247	104.6018	385.4102	78.1934	5.1934
Standard deviation:	24.1	1.1133	0.0000	3.8426	9.4048	24.0446	5.5133	1.7045
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)	(10)	(10)
2								
M e a n:	293.1	3.9662	100.0000	56.1258	114.7598*	415.8839	82.7250	5.0067
Standard deviation:	19.7	0.4313	0.0000	4.9239	7.4457	37.0145	7.9346	1.3918
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
3								
M e a n:	286.0	3.7172	100.0000	52.1418	105.8556	389.8361	79.4283	4.5115
Standard deviation:	34.0	0.5683	0.0000	4.4081	9.4741	38.6310	15.4313	0.9635
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)	(9)	(9)
4								
M e a n:	279.1	3.5960	100.0000	47.6720	101.0710	363.0485	72.4235	4.6298
Standard deviation:	11.7	0.5630	0.0000	7.1029	8.6562	20.6274	8.9212	1.0133
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Summary Statistics for % Organ to Brain Weight
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Group	Terminal Body wt. (g)	Pituitary gland	Spleen	Thymus	Thyroid/Para	Uterus
			F e m a l e	A n i m a l s		
1						
M e a n:	298.0	0.7389	28.6686	16.7898	1.5124	32.6190
Standard deviation:	24.1	0.1861	2.4749	3.4676	0.2872	8.6243
Number of observ. :	(10)	(10)	(10)	(10)	(10)	(10)
2						
M e a n:	293.1	0.8517	28.3811	13.6123	1.6909	37.4146
Standard deviation:	19.7	0.1248	2.7557	2.8473	0.1998	11.8969
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)
3						
M e a n:	286.0	0.8042	26.0215	12.5143*	1.4828	37.2768
Standard deviation:	34.0	0.1173	2.7620	3.3055	0.2403	15.2009
Number of observ. :	(10)	(9)	(9)	(9)	(9)	(9)
4						
M e a n:	279.1	0.7465	24.7962*	15.7169	1.6277	37.5569
Standard deviation:	11.7	0.0816	3.6493	2.6852	0.2790	12.5013
Number of observ. :	(9)	(9)	(9)	(9)	(9)	(9)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Summary statistics for absolute organ weights (g)
Study number: 036141N

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Group	Terminal Body wt. (g)	Brain	Length	Width
			M a l e	A n i m a l s
1				
M e a n:	525.0	2.1598	2.3200	1.2200
Standard deviation:	78.7	0.0774	0.1483	0.0837
Number of observ. :	(5)	(5)	(5)	(5)
2				
M e a n:	529.1	2.0950	2.4400	1.2600
Standard deviation:	73.2	0.1471	0.0894	0.0548
Number of observ. :	(5)	(5)	(5)	(5)
3				
M e a n:	514.4	2.1577	2.4600	1.4200+
Standard deviation:	24.9	0.1553	0.2510	0.0837
Number of observ. :	(5)	(5)	(5)	(5)
4				
M e a n:	492.9	2.1652	2.3600	1.3200
Standard deviation:	48.6	0.1260	0.3362	0.1304
Number of observ. :	(5)	(5)	(5)	(5)

* (+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
% (\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

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Summary statistics for absolute organ weights (g)
Study number: 036141N

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Group	Terminal Body wt. (g)	Brain	Length	Width
			F e m a l e	A n i m a l s
1				
M e a n:	307.6	2.0301	2.3700	1.2600
Standard deviation:	29.4	0.1220	0.1204	0.0894
Number of observ. :	(5)	(5)	(5)	(5)
2				
M e a n:	309.1	1.9734	2.2200	1.2400
Standard deviation:	21.1	0.0785	0.3421	0.0894
Number of observ. :	(5)	(5)	(5)	(5)
3				
M e a n:	295.7	1.9712	2.4200	1.2600
Standard deviation:	11.7	0.1100	0.0908	0.0548
Number of observ. :	(5)	(5)	(5)	(5)
4				
M e a n:	308.5	1.9797	2.3500	1.3100
Standard deviation:	4.8	0.0669	0.1000	0.0224
Number of observ. :	(5)	(5)	(5)	(5)

 *(+) = mean value of group was significantly different from control at P = 0.05(0.01) with Dunnett's test of significance
 %(\$) = mean value of group was significantly different from control at P = 0.05(0.01) with Modified T test of significance

	Summary of Sperm Evaluations Preface	Table 15
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Sperm Morphology241

	Summary of Sperm Evaluations Sperm Motility and Counts	Table 15
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Left Vas Deferens		Left Cauda Epididymis		Left Testis	
Motile sperm (%)	Progressively motile sperm (%)	Weight (g)	Sperm count (millions/g)	Weight (g)	Sperm count (millions/g)

Group 1 – 0 ppm (Control)

Mean	94	61	0.3496	569	1.8074	89
SD	3	9	0.0319	124	0.1203	27
n	10	10	10	10	10	10

Group 2 - 1000 ppm

Mean	94	61	0.3262	589	1.7186	75
SD	4	14	0.0267	113	0.1033	35
N	10	10	10	10	10	10

Group 3 – 5000 ppm

Mean	96	57	0.3154	591	1.6887	82
SD	2	11	0.0393	124	0.1395	27
N	10	10	10	10	10	10

Group 4 – 10000 ppm

Mean	91	67	0.3262	587	1.7387	76
SD	8	11	0.0201	192	0.1708	22
n	10	10	10	10	10	10

	Summary of Sperm Evaluations Sperm Morphology								Table 15
--	--	--	--	--	--	--	--	--	----------

Number Animals	Normal			Decapitate		Head Abnormal		Neck Abnormal		Tail Abnormal		Mid Tail Blob	
	Number	%		Number	%	Number	%	Number	%	Number	%	Number	%
Group 1 – 0 ppm (Control)													
10	Mean	197.2	98.6	1.2	0.6	0.5	0.3	0.1	0.1	0.6	0.3	0.5	0.3
	SD	1.6	0.8	1.1	0.6	1.0	0.5	0.3	0.2	0.8	0.4	0.8	0.4
Group 2 – 1000 ppm													
10	Mean	195.2	97.5	2.4	1.2	0.8	0.4	0.3	0.2	0.5	0.2	1.2	0.6
	SD	3.6	1.7	1.6	0.8	0.6	0.3	0.7	0.3	0.7	0.4	1.6	0.8
Group 3 – 5000 ppm													
10	Mean	196.3	98.2	1.7	0.9	0.9	0.5	0.1	0.1	0.5	0.3	0.6	0.3
	SD	1.3	0.7	1.2	0.6	1.0	0.5	0.3	0.2	1.1	0.5	1.1	0.5
Group 4 – 10000 ppm													
10	Mean	190.6	95.3**	1.2	0.6	1.4	0.7	0.4	0.2	0.5	0.3	6.1	3.1
	SD	8.1	4.1	1.4	0.7	1.3	0.7	0.5	0.3	0.5	0.3	8.2	4.1

** = $p \leq 0.01$

	Incidence Summary Report for Gross Necropsy Observations Preface	Table 16
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Main Study Animals

Terminal Sacrifice	243
Unscheduled Death	244

Neurotoxicity Animals

Terminal Sacrifice	245
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Corresponding exposure levels for each group were as follows:

Group 1	-	0 ppm
Group 2	-	1000 ppm
Group 3	-	5000 ppm
Group 4	-	10000 ppm

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Incidence Summary Report for Gross Necropsy Observations
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	-- Males --				-- Females --			
Group:	1	2	3	4	1	2	3	4
Number in group:	10	10	10	10	10	10	10	9
Within normal limits	6	9	8	7	6	6	5	7
Eyes								
Trauma	0	0	0	0	0	0	1	0
Kidneys								
Dilated Pelvis	0	0	0	0	1	0	0	0
Discolored	1	0	0	0	0	0	0	0
Lungs								
Discolored	2	0	0	2	1	1	2	0
Stomach								
Discolored	0	0	0	0	2	2	2	0
Thymus								
Discolored	1	1	1	0	1	0	1	1
Uterus								
Distended	0	0	0	0	1	0	2	0
Lymph Node, other								
Enlarged	0	0	1	0	0	0	0	0
Oviducts/Fallop								
Cyst	0	0	0	0	1	0	0	0
Skin (other)								
Hair Thin/Absent	0	0	0	0	0	0	1	0

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Unscheduled Deaths

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	-- Males --				-- Females --			
Group:	1	2	3	4	1	2	3	4
Number in group:	0	0	0	0	0	0	0	1
Within normal limits	0	0	0	0	0	0	0	0
Bone								
Mass	0	0	0	0	0	0	0	1

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 Princeton Research Center
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Terminal Sacrifice

Incidence Summary Report for Gross Necropsy Observations
 Study number: 036141N

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	-- Males --				-- Females --			
	Group: 1	2	3	4	1	2	3	4
Number in group:	5	5	5	5	5	5	5	5
Within normal limits	5	5	5	5	5	5	5	4
Urinary bladder								
Distended	0	0	0	0	0	0	0	1
Stomach								
Abnormal Contents	0	0	0	0	0	0	0	1

	Incidence Summary of Microscopic Findings with Severity Levels Preface	Table 17
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Main Study Animals

Terminal Sacrifice	247
Unscheduled Deaths	273

Neurotoxicity Animals

Terminal Sacrifice	292
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Key to Abbreviations

Ctls	=	Controls
Fibr	=	Fiber
LN	=	Lymph Node
Gang	=	Ganglia
N/	=	Nerve
Nad	=	No abnormal diagnoses
Nose/Turb Sec 1	=	Nose/Turbinates Section 1
Nose/Turb Sec 2	=	Nose/Turbinates Section 2
Nose/Turb Sec 3	=	Nose/Turbinates Section 3
Nose/Turb Sec 4	=	Nose/Turbinates Section 4
Oviducts/Fallop	=	Oviducts/Fallopian
SC	=	Spinal Cord
Submandib/Max	=	Submandibular/Submaxillary
TB+PL	=	Toluidine blue in plastic
VentrI	=	Ventrol
V-DVTC	=	Ventral Diverticulum
V-SM-G	=	Ventral Seromucous Glands
w/joint	=	with joint

Corresponding exposure levels for each group were as follows:

Group 1	-	0 ppm
Group 2	-	1000 ppm
Group 3	-	5000 ppm
Group 4	-	10000 ppm

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Adrenal Glands		10	10	10	10	10	10	10	9
CORTEX: ZONA FASICULATA-VACUOLATED									
Nad>		6	0	0	6	10	0	0	6
Minimal>		3	0	0	4	0	0	0	0
Slight>		1	0	0	0	0	0	0	3
.....Total Incidence of Finding Observed:		4	0	0	4	0	0	0	3
CORTEX: ZONA FASICULATA-HYPERPLASIA									
Nad>		3	0	0	4	3	0	0	7
Minimal>		2	0	0	1	0	0	0	0
Slight>		5	0	0	5	7	0	0	2
.....Total Incidence of Finding Observed:		7	0	0	6	7	0	0	2
Aorta		10	0	0	10	10	0	0	9
Bone		0	0	0	0	0	0	0	0
PRESUMPTIVE FRACTURE WITH HEMATOMA AND REPARATIVE -CHONDRO-OSSEOUS CALLUS									
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Brain		10	0	0	10	10	0	0	9
HEMORRHAGE(S)									
Nad>		10	0	0	10	9	0	0	8
Minimal>		0	0	0	0	1	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	1
Cecum		10	0	0	10	10	0	0	9
GLANDULAR DILATATION									
Nad>		9	0	0	10	10	0	0	9
Slight>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- Animals --				A f f e c t e d --				
Controls from group(s): 1		Animal sex:	-- M a l e s --			-- F e m a l e s --				
		Dosage group:	Ctls	2	3	4	Ctls 2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:	10	10	10	10	10	10	10	9
Cecum		Number examined:	10	0	0	10	10	0	0	9
LUMEN: NEMATODE(S)										
		Nad>	10	0	0	10	10	0	0	7
		Minimal>	0	0	0	0	0	0	0	2
.....Total Incidence of Finding Observed:			0	0	0	0	0	0	0	2
Cervical SC		Number examined:	10	0	0	10	10	0	0	9
Colon		Number examined:	10	0	0	10	10	0	0	9
ECTOPIC ADIPOSE TISSUE										
		Nad>	9	0	0	10	10	0	0	9
		Moderate>	1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:			1	0	0	0	0	0	0	0
LUMEN: NEMATODE(S)										
		Nad>	9	0	0	9	10	0	0	9
		Minimal>	1	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:			1	0	0	1	0	0	0	0
Duodenum		Number examined:	10	0	0	10	10	0	0	9
Epididymides		Number examined:	10	0	0	10				
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION										
		Nad>	8	0	0	9				
		Minimal>	0	0	0	1				
		Slight>	2	0	0	0				
.....Total Incidence of Finding Observed:			2	0	0	1				
Esophagus		Number examined:	10	0	0	10	10	0	0	9

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Tissues With Diagnoses		Ctls	2	3	4	Ctls	2	3	4
No. in group:		10	10	10	10	10	10	10	9
Eyes	Number examined:	0	0	0	0	0	0	1	0
	RETROBULBAR/SUBSCLERAL TISSUE: HEMORRHAGE WITH MIXED								
	-INFLAMMATORY CELL INFILTRATE								
	Moderate>	0	0	0	0	0	0	1	0
	Total Incidence of Finding Observed:	0	0	0	0	0	0	1	0
Femoral Marrow	Number examined:	9	0	0	9	10	0	0	9
	INCREASED FATTY MARROW/DECREASED HEMATOPOIETIC CELLS								
	Nad>	0	0	0	0	7	0	0	6
	Minimal>	8	0	0	7	3	0	0	3
	Slight>	1	0	0	2	0	0	0	0
	Total Incidence of Finding Observed:	9	0	0	9	3	0	0	3
Femur w/joint	Number examined:	9	0	0	9	10	0	0	9
	PHYSIS OPEN								
	Present>	9	0	0	9	10	0	0	9
	Total Incidence of Finding Observed:	9	0	0	9	10	0	0	9
Heart	Number examined:	10	0	0	10	10	0	0	9
	SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE								
	Nad>	5	0	0	3	8	0	0	8
	Minimal>	3	0	0	5	2	0	0	1
	Slight>	2	0	0	2	0	0	0	0
	Total Incidence of Finding Observed:	5	0	0	7	2	0	0	1
Ileum	Number examined:	10	0	0	10	10	0	0	9
	MUCOSAL DEGENERATIVE FOCUS								
	Nad>	9	0	0	10	10	0	0	9
	Slight>	1	0	0	0	0	0	0	0
	Total Incidence of Finding Observed:	1	0	0	0	0	0	0	0
Jejunum	Number examined:	10	0	0	10	10	0	0	9

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	10	10	10	10	10	10	10	9
Kidneys	Number examined:	10	0	0	10	10	0	0	9
CORTEX: CONVOLUTED TUBULAR EPITHELIUM-BASOPHILIC									
	Nad>	6	0	0	8	9	0	0	8
	Minimal>	3	0	0	1	1	0	0	0
	Slight>	1	0	0	1	0	0	0	1
.....Total Incidence of Finding Observed:		4	0	0	2	1	0	0	1
CORTEX/CORTICO-MEDULLARY JUNCTION: TUBULAR LUMENS- -EOSINOPHILIC MATERIAL									
	Nad>	10	0	0	10	10	0	0	8
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
CORTEX: SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
	Nad>	8	0	0	10	10	0	0	9
	Minimal>	1	0	0	0	0	0	0	0
	Slight>	1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		2	0	0	0	0	0	0	0
CORTEX/CORTICO-MEDULLARY JUNCTION: MINERAL DEPOSIT(S)									
	Nad>	10	0	0	9	6	0	0	5
	Minimal>	0	0	0	1	3	0	0	4
	Slight>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	4	0	0	4
MEDULLA: MINERAL DEPOSIT(S)									
	Nad>	10	0	0	10	9	0	0	6
	Minimal>	0	0	0	0	1	0	0	3
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	3

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		10	10	10	10	10	10	10	9
Kidneys	Number examined:	10	0	0	10	10	0	0	9
MEDULLARY TUBULAR DILATATION									
	Nad>	10	0	0	9	10	0	0	9
	Slight>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	0
PELVIS: DILATED									
	Nad>	10	0	0	9	9	0	0	9
	Slight>	0	0	0	1	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	1	0	0	0
PELVIS: LYMPHOCYTIC INFILTRATE WITH GERMINAL CENTER -DEVELOPMENT									
	Nad>	10	0	0	10	9	0	0	9
	Moderate>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
UROTHELIUM: HYPERPLASIA									
	Nad>	10	0	0	10	8	0	0	8
	Minimal>	0	0	0	0	0	0	0	1
	Slight>	0	0	0	0	2	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	2	0	0	1
Larynx	Number examined:	10	0	0	10	10	0	0	9
MUCOSA: EPITHELIUM-SQUAMOUS/SQUAMOID METAPLASIA									
	Nad>	9	0	0	10	10	0	0	9
	Minimal>	1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0
MUCOSA: EPITHELIUM-EROSION(S)/SINGLE CELL REGENERATION									
	Nad>	10	0	0	10	10	0	0	8
	Slight>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s	W i t h D i a g n o s e s	No. in group:	10	10	10	10	10	10	9
Larynx	Number examined:	10	0	0	10	10	0	0	9
	MUCOSA: MIXED INFLAMMATORY CELL INFILTRATE								
	Nad>	3	0	0	2	3	0	0	3
	Minimal>	6	0	0	7	7	0	0	4
	Slight>	1	0	0	1	0	0	0	2
	Total Incidence of Finding Observed:	7	0	0	8	7	0	0	6
	MUCOSA: LYMPHOID CELL AGGREGATE(S)								
	Nad>	6	0	0	8	10	0	0	7
	Slight>	4	0	0	2	0	0	0	2
	Total Incidence of Finding Observed:	4	0	0	2	0	0	0	2
	MUCOSA: GLANDULAR DIVERTICULUM WITH LUMINAL DEBRIS AND -MINERALIZATION								
	Nad>	9	0	0	10	10	0	0	8
	Minimal>	1	0	0	0	0	0	0	0
	Slight>	0	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:	1	0	0	0	0	0	0	1
	MUCOSA: GLANDULAR DILATATION								
	Nad>	9	0	0	7	7	0	0	6
	Minimal>	1	0	0	0	0	0	0	0
	Slight>	0	0	0	1	1	0	0	2
	Moderate>	0	0	0	2	2	0	0	1
	Total Incidence of Finding Observed:	1	0	0	3	3	0	0	3
	MUCOSA: GRANULOMATOUS INFLAMMATION (ASSOCIATED WITH -CARTILAGE)								
	Nad>	8	0	0	9	10	0	0	9
	Slight>	1	0	0	1	0	0	0	0
	Moderate>	1	0	0	0	0	0	0	0
	Total Incidence of Finding Observed:	2	0	0	1	0	0	0	0

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		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s	W i t h D i a g n o s e s	10	10	10	10	10	10	10	9
Larynx: V-DVTC	Number examined:	8	0	0	7	7	0	0	5
	MUCOSA: GLANDULAR DIVERTICULUM WITH OR WITHOUT LUMINAL								
	-DEBRIS AND MINERALIZATION								
	Nad>	4	0	0	6	6	0	0	5
	Minimal>	4	0	0	0	1	0	0	0
	Slight>	0	0	0	1	0	0	0	0
	Total Incidence of Finding Observed:	4	0	0	1	1	0	0	0
	MUCOSA: MIXED INFLAMMATORY CELL INFILTRATE								
	Nad>	0	0	0	1	2	0	0	0
	Minimal>	8	0	0	6	4	0	0	2
	Slight>	0	0	0	0	1	0	0	3
	Total Incidence of Finding Observed:	8	0	0	6	5	0	0	5
	VENTRAL MUCOSA: FOREIGN BODY MICROGRANULOMA								
	Nad>	8	0	0	7	7	0	0	4
	Slight>	0	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	1
	GLANDULAR DILATATION								
	Nad>	5	0	0	3	6	0	0	5
	Minimal>	0	0	0	1	0	0	0	0
	Slight>	2	0	0	2	1	0	0	0
	Moderate>	1	0	0	1	0	0	0	0
	Total Incidence of Finding Observed:	3	0	0	4	1	0	0	0
Larynx: V-SM-G	Number examined:	2	0	0	1	4	0	0	2
	MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID								
	-METAPLASIA								
	Nad>	1	0	0	1	3	0	0	2
	Minimal>	1	0	0	0	1	0	0	0
	Total Incidence of Finding Observed:	1	0	0	0	1	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s	N o . i n g r o u p :	10	10	10	10	10	10	10	9
Larynx: V-SM-G	Number examined:	2	0	0	1	4	0	0	2
MUCOSA/SUBMUCOSA [VSMG]: MIXED INFLAMMATORY CELLS WITH AND									
-WITHOUT LYMPHOID AGGREGATES									
	Minimal>	2	0	0	1	3	0	0	0
	Slight>	0	0	0	0	1	0	0	2
.....	Total Incidence of Finding Observed:	2	0	0	1	4	0	0	2
MUCOSA: LYMPHOID CELL AGGREGATE(S)									
	Nad>	1	0	0	0	2	0	0	0
	Minimal>	0	0	0	0	1	0	0	0
	Slight>	1	0	0	1	1	0	0	2
.....	Total Incidence of Finding Observed:	1	0	0	1	2	0	0	2
MUCOSA: GRANULOMATOUS INFLAMMATION (ASSOCIATED WITH									
-CARTILAGE)									
	Nad>	2	0	0	1	4	0	0	0
	Moderate>	0	0	0	0	0	0	0	2
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	2
MUCOSA: GLANDULAR-DILATATION									
	Nad>	2	0	0	0	3	0	0	2
	Slight>	0	0	0	1	1	0	0	0
.....	Total Incidence of Finding Observed:	0	0	0	1	1	0	0	0
Liver	Number examined:	10	0	0	10	10	0	0	9
SUBACUTE/CHRONIC INFLAMMATORY CELL FOCUS/FOCI									
	Nad>	3	0	0	0	6	0	0	3
	Minimal>	7	0	0	10	2	0	0	5
	Slight>	0	0	0	0	2	0	0	1
.....	Total Incidence of Finding Observed:	7	0	0	10	4	0	0	6
Lumbar SC	Number examined:	10	0	0	10	10	0	0	9

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		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Lungs		10 10 10 10				10 10 10 9			
HEMORRHAGE(S)		Number examined:				Number examined:			
Nad>		7	4	9	3	7	5	6	9
Minimal>		3	6	1	7	2	2	4	0
Slight>		0	0	0	0	1	3	0	0
.....Total Incidence of Finding Observed:		3	6	1	7	3	5	4	0
ALVEOLAR EPITHELIAL HYPERPLASIA									
Nad>		8	8	7	7	8	10	7	7
Minimal>		2	2	3	3	2	0	3	1
Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		2	2	3	3	2	0	3	2
ALVEOLAR/INTRAALVEOLAR MACROPHAGES: FOAMY CYTOPLASM									
Nad>		8	8	7	8	8	8	7	5
Minimal>		2	2	2	2	2	0	2	3
Slight>		0	0	1	0	0	2	1	1
.....Total Incidence of Finding Observed:		2	2	3	2	2	2	3	4
ALVEOLAR/INTRAALVEOLAR INFLAMMATORY CELL INFILTRATE WITH -MACROPHAGES									
Nad>		4	7	6	4	7	5	5	5
Minimal>		6	3	4	6	3	5	5	4
.....Total Incidence of Finding Observed:		6	3	4	6	3	5	5	4
PERIVASCULAR MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		8	6	3	4	5	9	7	7
Minimal>		2	4	5	5	5	1	2	1
Slight>		0	0	2	1	0	0	1	1
.....Total Incidence of Finding Observed:		2	4	7	6	5	1	3	2

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		10	10	10	10	10	10	10	9
Lungs	Number examined:	10	10	10	10	10	10	10	9
MICROGRANULOMA									
	Nad>	10	10	10	10	10	9	10	9
	Slight>	0	0	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	0	1	0	0
INTERSTITIUM: OSSEOUS METAPLASIA									
	Nad>	8	9	10	9	10	10	9	9
	Minimal>	2	1	0	1	0	0	1	0
.....Total Incidence of Finding Observed:		2	1	0	1	0	0	1	0
Mediastinal LN	Number examined:	10	0	0	10	10	0	0	8
GOLDEN-BROWN PIGMENT									
	Nad>	10	0	0	8	7	0	0	6
	Minimal>	0	0	0	1	0	0	0	2
	Slight>	0	0	0	1	2	0	0	0
	Moderate>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	2	3	0	0	2
FREE ERYTHROCYTES/ERYTHROPHAGOCYTOSIS									
	Nad>	0	0	0	2	2	0	0	1
	Minimal>	1	0	0	4	2	0	0	3
	Slight>	9	0	0	4	6	0	0	4
.....Total Incidence of Finding Observed:		10	0	0	8	8	0	0	7
PROMINENT PLASMA CELLS									
	Nad>	5	0	0	8	9	0	0	7
	Minimal>	1	0	0	1	0	0	0	0
	Slight>	4	0	0	1	1	0	0	1
.....Total Incidence of Finding Observed:		5	0	0	2	1	0	0	1

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Mediastinal LN		10	10	10	10	10	10	10	9
PROMINENT HISTIOCYTES		10	0	0	10	10	0	0	8
Nad>		8	0	0	7	9	0	0	7
Slight>		2	0	0	3	1	0	0	1
.....Total Incidence of Finding Observed:		2	0	0	3	1	0	0	1
PROMINENT MAST CELLS									
Nad>		6	0	0	8	6	0	0	6
Slight>		4	0	0	1	4	0	0	2
Moderate>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		4	0	0	2	4	0	0	2
LYMPHOID ATROPHY									
Nad>		10	0	0	9	9	0	0	7
Slight>		0	0	0	0	0	0	0	1
Moderate>		0	0	0	1	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	1	0	0	1
Mesenteric LN		10	0	0	10	10	0	0	9
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTES] SIZE/ -CELLULARITY									
Nad>		10	0	0	10	9	0	0	9
Marked>		0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
PROMINENT PLASMA CELLS									
Nad>		9	0	0	8	6	0	0	6
Minimal>		1	0	0	2	1	0	0	0
Slight>		0	0	0	0	3	0	0	3
.....Total Incidence of Finding Observed:		1	0	0	2	4	0	0	3

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s	W i t h D i a g n o s e s	10	10	10	10	10	10	10	9
Mesenteric LN		10	0	0	10	10	0	0	9
RETICULOENDOTHELIAL CELLS: FOAMY CYTOPLASM									
	Nad>	10	0	0	9	10	0	0	8
	Minimal>	0	0	0	0	0	0	0	1
	Slight>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	1
LYMPHOID ATROPHY									
	Nad>	6	0	0	10	10	0	0	9
	Slight>	3	0	0	0	0	0	0	0
	Moderate>	1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		4	0	0	0	0	0	0	0
PROMINENT MAST CELLS									
	Nad>	9	0	0	10	8	0	0	8
	Slight>	1	0	0	0	2	0	0	1
.....Total Incidence of Finding Observed:		1	0	0	0	2	0	0	1
Nose/Turb Sec 1		10	0	0	10	10	0	0	9
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY									
-CELLS WITH OR WITHOUT LYMPHOID CELL AGGREGATES									
	Nad>	9	0	0	10	10	0	0	7
	Minimal>	0	0	0	0	0	0	0	1
	Slight>	1	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	2
NASAL MUCOSA (VESTIBULAR EPITHELIUM): SQUAMOUS CELL									
-HYPERPLASIA									
	Nad>	10	0	0	10	10	0	0	9
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

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Controls from group(s): 1		Animal sex:	-- A n i m a l s --				A f f e c t e d --			
		Dosage group:	-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		No. in group:	Ctls	2	3	4	Ctls	2	3	4
			10	10	10	10	10	10	10	9
Nose/Turb Sec 1		Number examined:	10	0	0	10	10	0	0	9
NASAL MUCOSA (VESTIBULE, LAMINA PROPRIA AND BONE): FIBROUS										
-OSTEOGENITOR CELLS WITH WOVEN BONE FORMATION										
		Nad>	10	0	0	10	10	0	0	8
		Slight>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:			0	0	0	0	0	0	0	1
NASAL MUCOSA (RESPIRATORY EPITHELIUM): EPITHELIUM- GOBLET										
-CELL HYPERTROPHY/HYPERPLASIA										
		Nad>	1	0	0	1	0	0	0	0
		Minimal>	3	0	0	1	5	0	0	2
		Slight>	5	0	0	5	3	0	0	3
		Moderate>	1	0	0	3	2	0	0	4
.....Total Incidence of Finding Observed:			9	0	0	9	10	0	0	9
NASOTURBINATE: FUSION [LATERAL WALL]										
		Nad>	10	0	0	10	10	0	0	8
		Slight>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:			0	0	0	0	0	0	0	1
NASAL MUCOSA (NASOTURBINATE): ACUTE INFLAMMATORY CELL										
-INFILTRATE										
		Nad>	10	0	0	10	9	0	0	9
		Minimal>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:			0	0	0	0	1	0	0	0
NASAL MUCOSA (RESPIRATORY EPITHELIUM): EPITHELIAL										
-HYPERPLASIA										
		Nad>	10	0	0	10	9	0	0	8
		Slight>	0	0	0	0	1	0	0	1
.....Total Incidence of Finding Observed:			0	0	0	0	1	0	0	1

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		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
		Dosage group:				Dosage group:			
		Ctls				Ctls			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Nose/Turb Sec 1		10	10	10	10	10	10	10	9
Number examined:		10	0	0	10	10	0	0	9
NASAL MUCOSA (MAXILLOTURBINATE): MIXED INFLAMMATORY CELL									
-INFILTRATE WITH OR WITHOUT LYMPHOID CELLULAR AGGREGATES									
Nad>		10	0	0	9	10	0	0	8
Minimal>		0	0	0	0	0	0	0	1
Slight>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	1
NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR									
-WITHOUT LYMPHOID CELLULAR AGGREGATES									
Nad>		10	0	0	10	6	0	0	5
Minimal>		0	0	0	0	4	0	0	1
Slight>		0	0	0	0	0	0	0	3
.....Total Incidence of Finding Observed:		0	0	0	0	4	0	0	4
ODONTOPATHY									
Nad>		9	0	0	9	10	0	0	6
Slight>		0	0	0	0	0	0	0	1
Moderate>		1	0	0	1	0	0	0	2
.....Total Incidence of Finding Observed:		1	0	0	1	0	0	0	3
PERIODONTAL (AMEOLOBLAST EPITHELIUM): ACUTE INFLAMMATION									
Nad>		10	0	0	10	10	0	0	7
Slight>		0	0	0	0	0	0	0	2
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	2
VOMERONASAL ORGAN: MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		8	0	0	3	2	0	0	1
Minimal>		0	0	0	4	5	0	0	6
Slight>		2	0	0	3	3	0	0	2
.....Total Incidence of Finding Observed:		2	0	0	7	8	0	0	8

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		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
		Dosage group:				Dosage group:			
		Ctl				Ctl			
Tissues With Diagnoses		No. in group:				No. in group:			
Nose/Turb Sec 1		10	10	10	10	10	10	10	9
BONE: REMODELING WITH WOVEN BONE FORMATION									
		Number examined:				Number examined:			
		10	0	0	10	10	0	0	9
		Nad>				Nad>			
		10	0	0	10	10	0	0	8
		Slight>				Slight>			
		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Nose/Turb Sec 2		10	0	0	10	10	0	0	9
NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED									
-INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
		Nad>				Nad>			
		2	0	0	6	4	0	0	3
		Minimal>				Minimal>			
		1	0	0	2	1	0	0	2
		Slight>				Slight>			
		7	0	0	2	5	0	0	4
.....Total Incidence of Finding Observed:		8	0	0	4	6	0	0	6
NASAL MUCOSA (RESPIRATORY EPITHELIUM): GOBLET CELL									
-HYPERPLASIA/HYPERTROPHY									
		Minimal>				Minimal>			
		1	0	0	2	5	0	0	1
		Slight>				Slight>			
		7	0	0	7	4	0	0	8
		Moderate>				Moderate>			
		2	0	0	1	1	0	0	0
.....Total Incidence of Finding Observed:		10	0	0	10	10	0	0	9
NASAL MUCOSA (RESPIRATORY/OLFACTORY JUNCTION): SUBMUCOSAL									
-GLANDULAR EOSINOPHILIC SECRETORY MATERIAL									
		Nad>				Nad>			
		10	0	0	8	10	0	0	9
		Slight>				Slight>			
		0	0	0	2	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	2	0	0	0	0
NASAL MUCOSA (OLFACTORY EPITHELIUM): MIXED INFLAMMATORY									
-CELL INFILTRATE									
		Nad>				Nad>			
		9	0	0	9	10	0	0	9
		Slight>				Slight>			
		1	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	1	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
		Ctl's				Ctl's			
T i s s u e s	W i t h D i a g n o s e s	No. in group:							
Nose/Turb Sec 2	Number examined:	10	10	10	10	10	10	10	9
	NASAL MUCOSA (OLFACTORY EPITHELIUM): PROMINENT BOWMAN'S								
	-GLAND(S)/GLANDULAR EPITHELIAL HYPERPLASIA								
	Nad>	10	0	0	7	6	0	0	8
	Slight>	0	0	0	3	4	0	0	1
	Total Incidence of Finding Observed:	0	0	0	3	4	0	0	1
	NASOTURBINATE: FUSION (LATERAL WALL)								
	Nad>	10	0	0	10	10	0	0	8
	Minimal>	0	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	1
	NASAL MUCOSA [NASOTURBINATE]: MIXED INFLAMMATORY CELL								
	-INFILTRATE WITH OR WITHOUT LYMPHOID CELL AGGREGATES								
	Nad>	9	0	0	8	10	0	0	9
	Minimal>	0	0	0	1	0	0	0	0
	Slight>	1	0	0	0	0	0	0	0
	Moderate>	0	0	0	1	0	0	0	0
	Total Incidence of Finding Observed:	1	0	0	2	0	0	0	0
	ODONTOPATHY								
	Nad>	9	0	0	10	10	0	0	6
	Slight>	0	0	0	0	0	0	0	1
	Moderate>	1	0	0	0	0	0	0	2
	Total Incidence of Finding Observed:	1	0	0	0	0	0	0	3
	NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR								
	-WITHOUT LYMPHOID AGGREGATES								
	Nad>	1	0	0	1	2	0	0	2
	Minimal>	4	0	0	2	2	0	0	2
	Slight>	4	0	0	7	6	0	0	5
	Moderate>	1	0	0	0	0	0	0	0
	Total Incidence of Finding Observed:	9	0	0	9	8	0	0	7

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
		Dosage group:				Dosage group:			
		No. in group:				No. in group:			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 2		10	10	10	10	10	10	10	9
Number examined:		10	0	0	10	10	0	0	9
NASAL LACRIMAL DUCT (EPITHELIUM): SQUAMOUS EPITHELIAL									
-HYPERPLASIA									
Nad>		9	0	0	10	9	0	0	8
Minimal>		0	0	0	0	1	0	0	0
Slight>		1	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		1	0	0	0	1	0	0	1
VOMERNASAL ORGAN: MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		8	0	0	3	2	0	0	5
Minimal>		2	0	0	6	8	0	0	3
Slight>		0	0	0	1	0	0	0	1
.....Total Incidence of Finding Observed:		2	0	0	7	8	0	0	4
Nose/Turb Sec 3		10	0	0	10	10	0	0	9
Number examined:		10	0	0	10	10	0	0	9
NASAL LUMEN: AMPHOPHILIC CONCRETIONS									
Nad>		9	0	0	10	10	0	0	9
Slight>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0
NASAL SINUS: PROMINENT NASAL ASSOCIATED LYMPHOID TISSUE									
Nad>		1	0	0	2	1	0	0	0
Minimal>		0	0	0	1	1	0	0	0
Slight>		8	0	0	7	5	0	0	9
Moderate>		1	0	0	0	3	0	0	0
.....Total Incidence of Finding Observed:		9	0	0	8	9	0	0	9
PHARYNGEAL DUCT: PROMINENT NASAL ASSOCIATED LYMPHOID TISSUE									
Nad>		1	0	0	0	0	0	0	0
Slight>		8	0	0	9	7	0	0	9
Moderate>		1	0	0	1	3	0	0	0
.....Total Incidence of Finding Observed:		9	0	0	10	10	0	0	9

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 3		10	10	10	10	10	10	10	9
PHARYNGEAL DUCT (RESPIRATORY EPITHELIUM): GOBLET CELL		10	0	0	10	10	0	0	9
-HYPERPLASIA/HYPERTROPHY									
Minimal>		2	0	0	2	1	0	0	1
Slight>		8	0	0	7	7	0	0	5
Moderate>		0	0	0	1	2	0	0	3
.....Total Incidence of Finding Observed:		10	0	0	10	10	0	0	9
NASAL MUCOSA [GLAND]: DUCTAL/ACINAR EPITHELIAL HYPERPLASIA									
-WITH OR WITHOUT EPITHELIAL VACUOLATION									
Nad>		9	0	0	5	1	0	0	5
Slight>		1	0	0	5	8	0	0	4
Moderate>		0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	5	9	0	0	4
PALATE: ECTOPIC SEBACEOUS GLAND									
Nad>		10	0	0	9	10	0	0	9
Present>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	0
SQUAMOUS EPITHELIAL HYPERPLASIA									
Nad>		10	0	0	8	10	0	0	9
Minimal>		0	0	0	1	0	0	0	0
Slight>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	2	0	0	0	0
PERIODONTAL DISEASE									
Nad>		10	0	0	10	10	0	0	9
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Nose/Turb Sec 4		10	10	10	10	10	10	10	9
Number examined:		10	0	0	10	10	0	0	9
NASAL MUCOSA (RESPIRATORY EPITHELIUM): GOBLET CELL									
-HYPERPLASIA/HYPERTROPHY									
Nad>		1	0	0	0	0	0	0	0
Minimal>		2	0	0	5	5	0	0	6
Slight>		7	0	0	4	5	0	0	3
Moderate>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		9	0	0	10	10	0	0	9
PHARYNGEAL DUCT: PROMINENT NASAL LYMPHOID ASSOCIATED TISSUE									
Nad>		5	0	0	1	4	0	0	4
Minimal>		1	0	0	2	0	0	0	1
Slight>		4	0	0	7	6	0	0	4
.....Total Incidence of Finding Observed:		5	0	0	9	6	0	0	5
PALATE: FOREIGN BODY MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		10	0	0	10	9	0	0	9
Slight>		0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
PALATE-TOOTH JUNCTION: MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		10	0	0	10	10	0	0	8
Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PERIODONTAL DISEASE									
Nad>		9	0	0	10	10	0	0	9
Slight>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- Animals --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
		Dosage group:				Ctl's			
T i s s u e s W i t h D i a g n o s e s		No. in group:				Ctl's			
Ovaries	Number examined:	10	10	10	10	10	10	10	9
LUTEAL CYST(S)									
	Nad>					8	0	0	5
	Minimal>					1	0	0	2
	Slight>					1	0	0	2
.....Total Incidence of Finding Observed:						2	0	0	4
MINERAL DEPOSIT(S)									
	Nad>					10	0	0	7
	Minimal>					0	0	0	2
.....Total Incidence of Finding Observed:						0	0	0	2
Oviducts/Fallop	Number examined:					1	0	0	0
CYST(S)									
	Moderate>					1	0	0	0
.....Total Incidence of Finding Observed:						1	0	0	0
Pancreas	Number examined:	10	0	0	10	10	0	0	9
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
	Nad>	8	0	0	9	10	0	0	6
	Minimal>	2	0	0	1	0	0	0	1
	Slight>	0	0	0	0	0	0	0	2
.....Total Incidence of Finding Observed:		2	0	0	1	0	0	0	3
ATROPHY									
	Nad>	7	0	0	9	9	0	0	8
	Minimal>	2	0	0	1	1	0	0	1
	Slight>	1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		3	0	0	1	1	0	0	1
Parathyroid	Number examined:	10	0	0	8	10	0	0	8

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Prostate		10	10	10	10	10	10	10	9
ATROPHY									
Number examined:		10	0	0	10				
Nad>		3	0	0	3				
Minimal>		2	0	0	0				
Slight>		4	0	0	7				
Moderate>		1	0	0	0				
.....Total Incidence of Finding Observed:		7	0	0	7				
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
Nad>		3	0	0	6				
Minimal>		3	0	0	2				
Slight>		4	0	0	2				
.....Total Incidence of Finding Observed:		7	0	0	4				
Rectum/Low Colon		10	0	0	10	10	0	0	9
GLANDULAR DILATATION									
Nad>		9	0	0	10	10	0	0	9
Minimal>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0
LUMEN: NEMATODE(S)									
Nad>		9	0	0	7	10	0	0	9
Minimal>		1	0	0	3	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	3	0	0	0	0
Salivary glands		10	0	0	9	10	0	0	9
INTERSTITIAL AMPHOPHILIC MATERIAL									
Nad>		9	0	0	9	10	0	0	9
Slight>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	0	0	0	0
Sciatic Nerve		8	0	0	10	9	0	0	9
Seminal vesicles		10	0	0	10				
Number examined:									

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Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		10	10	10	10	10	10	10	9
Skin (other)	Number examined:	0	0	0	0	0	0	1	0
SEBACEOUS GLAND HYPERTROPHY/HYPERPLASIA									
	Slight>	0	0	0	0	0	0	1	0
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	1	0
Spleen	Number examined:	10	0	0	10	10	0	0	9
GOLDEN-BROWN PIGMENT									
	Nad>	5	0	0	7	2	0	0	1
	Minimal>	5	0	0	2	4	0	0	7
	Slight>	0	0	0	0	4	0	0	1
	Moderate>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		5	0	0	3	8	0	0	8
LYMPHOID DEPLETION									
	Nad>	10	0	0	8	10	0	0	9
	Slight>	0	0	0	2	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	2	0	0	0	0
Sternal Marrow	Number examined:	10	0	0	10	10	0	0	8
INCREASED FATTY MARROW/DECREASED HEMATOPOIETIC CELLS									
	Nad>	8	0	0	8	6	0	0	4
	Minimal>	2	0	0	2	4	0	0	4
.....Total Incidence of Finding Observed:		2	0	0	2	4	0	0	4
Sternum	Number examined:	10	0	0	10	10	0	0	9
FIBROUS OSTEOPROGENITOR CELL FOCUS/FOCI									
	Nad>	10	0	0	10	10	0	0	7
	Slight>	0	0	0	0	0	0	0	2
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	2

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

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		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
S t e r n u m		10	10	10	10	10	10	10	9
CHONDROMALACIA		10	0	0	10	10	0	0	9
Nad>		7	0	0	4	6	0	0	8
Minimal>		2	0	0	4	4	0	0	1
Slight>		1	0	0	2	0	0	0	0
.....Total Incidence of Finding Observed:		3	0	0	6	4	0	0	1
DECREASED TRABECULAR BONE									
Nad>		8	0	0	7	10	0	0	9
Slight>		1	0	0	3	0	0	0	0
Moderate>		1	0	0	0	0	0	0	0
.....Total Incidence of Finding Observed:		2	0	0	3	0	0	0	0
Stomach		10	0	0	10	10	2	1	9
GLANDULAR DILATATION									
Nad>		8	0	0	10	10	1	1	9
Minimal>		2	0	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		2	0	0	0	0	1	0	0
SUPERFICIAL MUCOUS/CELLULAR DEBRIS									
Nad>		10	0	0	10	10	0	1	9
Slight>		0	0	0	0	0	2	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	0	2	0	0
Submandib/Max LN		9	0	1	9	10	0	0	9
FREE ERYTHROCYTES/ERYTHROPHAGOCYTOSIS									
Nad>		5	0	1	5	5	0	0	6
Minimal>		4	0	0	4	4	0	0	2
Slight>		0	0	0	0	1	0	0	1
.....Total Incidence of Finding Observed:		4	0	0	4	5	0	0	3

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

Controls from group(s): 1		Animal sex:	-- Animals				Affected --			
		Dosage group:	-- Males --				-- Females --			
Tissues With Diagnoses		No. in group:	Ctls	2	3	4	Ctls	2	3	4
Submandib/Max LN		Number examined:	9	0	1	9	10	0	0	9
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTES]										
-SIZE/CELLULARITY										
		Nad>	9	0	1	9	10	0	0	8
		Moderate>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding		Observed:	0	0	0	0	0	0	0	1
PROMINENT PLASMA CELLS										
		Nad>	3	0	0	0	1	0	0	2
		Slight>	3	0	0	1	6	0	0	4
		Moderate>	3	0	1	8	3	0	0	3
.....Total Incidence of Finding		Observed:	6	0	1	9	9	0	0	7
PROMINENT MAST CELLS										
		Nad>	5	0	0	5	5	0	0	4
		Minimal>	0	0	0	0	0	0	0	1
		Slight>	4	0	1	4	5	0	0	4
.....Total Incidence of Finding		Observed:	4	0	1	4	5	0	0	5
LYMPHOID ATROPHY										
		Nad>	9	0	1	9	10	0	0	8
		Slight>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding		Observed:	0	0	0	0	0	0	0	1
Testes		Number examined:	10	0	0	10				
Testis Staging		Number examined:	10	0	0	10				
Thoracic SC		Number examined:	10	0	0	10	10	0	0	9

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Terminal Sacrifice

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
Tissues With Diagnoses		No. in group:				No. in group:			
		10	10	10	10	10	10	10	9
Thymus	Number examined:	9	1	1	10	10	0	1	9
HEMORRHAGE(S)									
	Nad>	1	0	0	3	4	0	0	4
	Minimal>	4	0	1	4	5	0	0	1
	Slight>	4	1	0	3	1	0	1	4
	Total Incidence of Finding Observed:	8	1	1	7	6	0	1	5
INVOLUTION/CORTICAL LYMPHOCYTOLYSIS									
	Nad>	0	1	1	1	5	0	0	3
	Minimal>	9	0	0	9	5	0	1	6
	Total Incidence of Finding Observed:	9	0	0	9	5	0	1	6
Thyroid	Number examined:	10	0	0	10	10	0	0	9
ULTIMOBANCHIAL REST(S)									
	Nad>	9	0	0	10	6	0	0	7
	Minimal>	0	0	0	0	2	0	0	0
	Slight>	1	0	0	0	2	0	0	2
	Total Incidence of Finding Observed:	1	0	0	0	4	0	0	2
ECTOPIC THYMIC TISSUE									
	Nad>	10	0	0	9	9	0	0	9
	Slight>	0	0	0	1	1	0	0	0
	Total Incidence of Finding Observed:	0	0	0	1	1	0	0	0
Trachea	Number examined:	10	0	0	10	10	0	0	9
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
	Nad>	9	0	0	6	7	0	0	9
	Minimal>	0	0	0	3	2	0	0	0
	Slight>	1	0	0	1	1	0	0	0
	Total Incidence of Finding Observed:	1	0	0	4	3	0	0	0
Urinary bladder	Number examined:	10	0	0	10	10	0	0	9

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Uterus		10	10	10	10	10	10	10	9
LUMEN: DILATED		Number examined:				10	0	2	9
		Nad>				6	0	0	6
		Slight>				4	0	0	1
		Moderate>				0	0	2	2
.....Total Incidence of Finding Observed:						4	0	2	3

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 20-Jul-05 To 22-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Adrenal Glands		0	0	0	0	0	0	0	1
CORTEX: ZONA FASICULATA-VACUOLATED									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
CORTEX: ZONA FASICULATA-HYPERPLASIA									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Aorta		0	0	0	0	0	0	0	1
Bone		0	0	0	0	0	0	0	1
PRESUMPTIVE FRACTURE WITH HEMATOMA AND REPARATIVE -CHONDRO-OSSEOUS CALLUS									
Moderate>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Brain		0	0	0	0	0	0	0	1
HEMORRHAGE(S)									
Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Cecum		0	0	0	0	0	0	0	1
GLANDULAR DILATATION									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
LUMEN: NEMATODE(S)									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Cervical SC		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Colon		0	0	0	0	0	0	0	1
ECTOPIC ADIPOSE TISSUE									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
LUMEN: NEMATODE(S)									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Duodenum		0	0	0	0	0	0	0	1
Epididymides		0	0	0	0				
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
.....Total Incidence of Finding Observed:		0	0	0	0				
Esophagus		0	0	0	0	0	0	0	1
Eyes		0	0	0	0	0	0	0	0
RETROBULBAR/SUBSCLERAL TISSUE: HEMORRHAGE WITH MIXED									
-INFLAMMATORY CELL INFILTRATE									
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Femoral Marrow		0	0	0	0	0	0	0	1
INCREASED FATTY MARROW/DECREASED HEMATOPOIETIC CELLS									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Femur w/joint		0	0	0	0	0	0	0	1
PHYSIS OPEN									
Present>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		0	0	0	0	0	0	0	1
Heart	Number examined:	0	0	0	0	0	0	0	1
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Ileum	Number examined:	0	0	0	0	0	0	0	1
MUCOSAL DEGENERATIVE FOCUS									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Jejunum	Number examined:	0	0	0	0	0	0	0	1
Kidneys	Number examined:	0	0	0	0	0	0	0	1
CORTEX: CONVOLUTED TUBULAR EPITHELIUM-BASOPHILIC									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
CORTEX/CORTICO-MEDULLARY JUNCTION: TUBULAR LUMENS- -EOSINOPHILIC MATERIAL									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
CORTEX: SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
CORTEX/CORTICO-MEDULLARY JUNCTION: MINERAL DEPOSIT(S)									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
		Ctls	2	3	4	Ctls	2	3	4
Tissues With Diagnoses	No. in group:	0	0	0	0	0	0	0	1
Kidneys	Number examined:	0	0	0	0	0	0	0	1
MEDULLA: MINERAL DEPOSIT(S)	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MEDULLARY TUBULAR DILATATION	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PELVIS: DILATED	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PELVIS: LYMPHOCYTIC INFILTRATE WITH GERMINAL CENTER -DEVELOPMENT	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
UROTHELIUM: HYPERPLASIA	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Larynx	Number examined:	0	0	0	0	0	0	0	1
MUCOSA: EPITHELIUM-SQUAMOUS/SQUAMOID METAPLASIA	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: EPITHELIUM-EROSION(S)/SINGLE CELL REGENERATION	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Toxicity Study in Rats with Neurotoxicity Assessments
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		0	0	0	0	0	0	0	1
Larynx	Number examined:	0	0	0	0	0	0	0	1
MUCOSA: MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: LYMPHOID CELL AGGREGATE(S)									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: GLANDULAR DIVERTICULUM WITH LUMINAL DEBRIS AND -MINERALIZATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: GLANDULAR DILATATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: GRANULOMATOUS INFLAMMATION (ASSOCIATED WITH -CARTILAGE)									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Larynx: V-DVTC	Number examined:	0	0	0	0	0	0	0	1
MUCOSA: GLANDULAR DIVERTICULUM WITH OR WITHOUT LUMINAL -DEBRIS AND MINERALIZATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
Toxicity Study in Rats with Neurotoxicity Assessments
and In Vivo Genotoxicity Assessments

Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Tissues With Diagnoses		Ctls	2	3	4	Ctls	2	3	4
Larynx: V-DVTC		0	0	0	0	0	0	0	1
VENTRAL MUCOSA: FOREIGN BODY MICROGRANULOMA									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
GLANDULAR DILATATION									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Larynx: V-SM-G		0	0	0	0	0	0	0	1
MUCOSA (SEROMUCOUS GLANDS): EPITHELIAL-SQUAMOUS/SQUAMOID									
-METAPLASIA									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA/SUBMUCOSA [VSMG]: MIXED INFLAMMATORY CELLS WITH AND									
-WITHOUT LYMPHOID AGGREGATES									
Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
MUCOSA: LYMPHOID CELL AGGREGATE(S)									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: GRANULOMATOUS INFLAMMATION (ASSOCIATED WITH									
-CARTILAGE)									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MUCOSA: GLANDULAR-DILATATION									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4
Liver	Number examined:	0	0	0	0	0	0	0	1
SUBACUTE/CHRONIC INFLAMMATORY CELL FOCUS/FOCI									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Lumbar SC	Number examined:	0	0	0	0	0	0	0	1
Lungs	Number examined:	0	0	0	0	0	0	0	1
HEMORRHAGE(S)									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
ALVEOLAR EPITHELIAL HYPERPLASIA									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
ALVEOLAR/INTRAALVEOLAR MACROPHAGES: FOAMY CYTOPLASM									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
ALVEOLAR/INTRAALVEOLAR INFLAMMATORY CELL INFILTRATE WITH -MACROPHAGES									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PERIVASCULAR MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
MICROGRANULOMA									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Lungs		0	0	0	0	0	0	0	1
INTERSTITIUM: OSSEOUS METAPLASIA									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Mediastinal LN		0	0	0	0	0	0	0	1
GOLDEN-BROWN PIGMENT									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
FREE ERYTHROCYTES/ERYTHROPHAGOCYTOSIS									
.....Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PROMINENT PLASMA CELLS									
.....Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PROMINENT HISTIOCYTES									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PROMINENT MAST CELLS									
.....Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
LYMPHOID ATROPHY									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s	No. in group:	Ctls	2	3	4	Ctls	2	3	4
Mesenteric LN	Number examined:	0	0	0	0	0	0	0	1
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTES] SIZE/ -CELLULARITY	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PROMINENT PLASMA CELLS	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
RETICULOENDOTHELIAL CELLS: FOAMY CYTOPLASM	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
LYMPHOID ATROPHY	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PROMINENT MAST CELLS	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 1	Number examined:	0	0	0	0	0	0	0	1
NASAL MUCOSA (VESTIBULAR EPITHELIUM): MIXED INFLAMMATORY -CELLS WITH OR WITHOUT LYMPHOID CELL AGGREGATES	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (VESTIBULAR EPITHELIUM): SQUAMOUS CELL -HYPERPLASIA	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s	W i t h D i a g n o s e s	No. in group:							
Controls from group(s): 1									
Animal sex:									
Dosage group:									
No. in group:		0	0	0	0	0	0	0	1
Nose/Turb Sec 1Number examined:		0	0	0	0	0	0	0	1
NASAL MUCOSA (VESTIBULE, LAMINA PROPRIA AND BONE): FIBROUS									
-OSTEOGENITOR CELLS WITH WOVEN BONE FORMATION									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (RESPIRATORY EPITHELIUM): EPITHELIUM- GOBLET									
-CELL HYPERTROPHY/HYPERPLASIA									
Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
NASOTURBINATE: FUSION [LATERAL WALL]									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (NASOTURBINATE): ACUTE INFLAMMATORY CELL									
-INFILTRATE									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (RESPIRATORY EPITHELIUM): EPITHELIAL									
-HYPERPLASIA									
Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
NASAL MUCOSA (MAXILLOTURBINATE): MIXED INFLAMMATORY CELL									
-INFILTRATE WITH OR WITHOUT LYMPHOID CELLULAR AGGREGATES									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 1	Number examined:	0	0	0	0	0	0	0	1
NASAL LACRIMAL DUCT: MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID CELLULAR AGGREGATES									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
ODONTOPATHY									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PERIODONTAL (AMEOLOBLAST EPITHELIUM): ACUTE INFLAMMATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
VOMERONASAL ORGAN: MIXED INFLAMMATORY CELL INFILTRATE									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
BONE: REMODELING WITH WOVEN BONE FORMATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 2	Number examined:	0	0	0	0	0	0	0	1
NASAL MUCOSA (RESPIRATORY/VESTIBULAR JUNCTION): MIXED -INFLAMMATORY CELLS WITH OR WITHOUT LYMPHOID AGGREGATES									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (RESPIRATORY EPITHELIUM): GOBLET CELL -HYPERPLASIA/HYPERTROPHY									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 2	Number examined:	0	0	0	0	0	0	0	1
NASAL MUCOSA (RESPIRATORY/OLFACTORY JUNCTION): SUBMUCOSAL -GLANDULAR EOSINOPHILIC SECRETORY MATERIAL									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (OLFACTORY EPITHELIUM): MIXED INFLAMMATORY -CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA (OLFACTORY EPITHELIUM): PROMINENT BOWMAN'S -GLAND(S)/GLANDULAR EPITHELIAL HYPERPLASIA									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASOTURBINATE: FUSION (LATERAL WALL)									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL MUCOSA [NASOTURBINATE]: MIXED INFLAMMATORY CELL -INFILTRATE WITH OR WITHOUT LYMPHOID CELL AGGREGATES									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
ODONTOPATHY									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 2Number examined:		0	0	0	0	0	0	0	1
NASOLACRIMAL DUCT(S): MIXED INFLAMMATORY CELLS WITH OR -WITHOUT LYMPHOID AGGREGATES									
.....Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
NASAL LACRIMAL DUCT (EPITHELIUM): SQUAMOUS EPITHELIAL -HYPERPLASIA									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
VOMERNASAL ORGAN: MIXED INFLAMMATORY CELL INFILTRATE									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 3Number examined:		0	0	0	0	0	0	0	1
NASAL LUMEN: AMPHOPHILIC CONCRETIONS									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
NASAL SINUS: PROMINENT NASAL ASSOCIATED LYMPHOID TISSUE									
.....Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PHARYNGEAL DUCT: PROMINENT NASAL ASSOCIATED LYMPHOID TISSUE									
.....Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PHARYNGEAL DUCT (RESPIRATORY EPITHELIUM): GOBLET CELL -HYPERPLASIA/HYPERTROPHY									
.....Slight>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s	No. in group:	Ctls	2	3	4	Ctls	2	3	4
Nose/Turb Sec 3	Number examined:	0	0	0	0	0	0	0	1
NASAL MUCOSA [GLAND]: DUCTAL/ACINAR EPITHELIAL HYPERPLASIA									
-WITH OR WITHOUT EPITHELIAL VACUOLATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PALATE: ECTOPIC SEBACEOUS GLAND									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
SQUAMOUS EPITHELIAL HYPERPLASIA									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PERIODONTAL DISEASE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Nose/Turb Sec 4	Number examined:	0	0	0	0	0	0	0	1
NASAL MUCOSA (RESPIRATORY EPITHELIUM): GOBLET CELL									
-HYPERPLASIA/HYPERTROPHY									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PHARYNGEAL DUCT: PROMINENT NASAL LYMPHOID ASSOCIATED TISSUE									
	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
PALATE: FOREIGN BODY MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
		Ctl's				Ctl's			
Tissues With Diagnoses	Animal sex: Dosage group: No. in group:	0	0	0	0	0	0	0	1
Nose/Turb Sec 4	Number examined:	0	0	0	0	0	0	0	1
PALATE-TOOTH JUNCTION: MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PERIODONTAL DISEASE									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Ovaries	Number examined:					0	0	0	1
LUTEAL CYST(S)									
	Nad>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	0
MINERAL DEPOSIT(S)									
	Nad>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	0
Oviducts/Fallop	Number examined:					0	0	0	0
CYST(S)									
.....Total Incidence of Finding Observed:						0	0	0	0
Pancreas	Number examined:	0	0	0	0	0	0	0	1
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
ATROPHY									
	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Parathyroid	Number examined:	0	0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s		No. in group:	0	0	0	0	0	0	1
Prostate	Number examined:	0	0	0	0				
ATROPHY									
.....	Total Incidence of Finding Observed:	0	0	0	0				
SUBACUTE (CHRONIC ACTIVE)/CHRONIC INFLAMMATION									
.....	Total Incidence of Finding Observed:	0	0	0	0				
Rectum/Low Colon	Number examined:	0	0	0	0	0	0	0	1
GLANDULAR DILATATION									
	Nad>	0	0	0	0	0	0	0	1
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
LUMEN: NEMATODE(S)									
	Nad>	0	0	0	0	0	0	0	1
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Salivary glands	Number examined:	0	0	0	0	0	0	0	1
INTERSTITIAL AMPHOPHILIC MATERIAL									
	Nad>	0	0	0	0	0	0	0	1
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Sciatic Nerve	Number examined:	0	0	0	0	0	0	0	1
Seminal vesicles	Number examined:	0	0	0	0				
Skin (other)	Number examined:	0	0	0	0	0	0	0	0
SEBACEOUS GLAND HYPERTROPHY/HYPERPLASIA									
.....	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Spleen	Number examined:	0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas: A 13-Week Whole-Body Inhalation
Toxicity Study in Rats with Neurotoxicity Assessments
and In Vivo Genotoxicity Assessments

Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s	W i t h D i a g n o s e s	No. in group:							
Spleen		Number examined:	0	0	0	0	0	0	1
	GOLDEN-BROWN PIGMENT								
		Slight>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	1
	LYMPHOID DEPLETION								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0
Sternal Marrow		Number examined:	0	0	0	0	0	0	1
	INCREASED FATTY MARROW/DECREASED HEMATOPOIETIC CELLS								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0
Sternum		Number examined:	0	0	0	0	0	0	1
	FIBROUS OSTEOPROGENITOR CELL FOCUS/FOCI								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0
	CHONDROMALACIA								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0
	DECREASED TRABECULAR BONE								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0
Stomach		Number examined:	0	0	0	0	0	0	1
	GLANDULAR DILATATION								
		Nad>	0	0	0	0	0	0	1
	Total Incidence of Finding Observed:		0	0	0	0	0	0	0

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
StomachNumber examined:		0	0	0	0	0	0	0	1
SUPERFICIAL MUCOUS/CELLULAR DEBRIS									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Submandib/Max LNNumber examined:		0	0	0	0	0	0	0	1
FREE ERYTHROCYTES/ERYTHROPHAGOCYTOSIS									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PARACORTICAL AREA: INCREASED [T-LYMPHOCYTES]									
-SIZE/CELLULARITY									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PROMINENT PLASMA CELLS									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
PROMINENT MAST CELLS									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
LYMPHOID ATROPHY									
Nad>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
TestesNumber examined:		0	0	0	0				
Testis StagingNumber examined:		0	0	0	0				
Thoracic SCNumber examined:		0	0	0	0	0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Unscheduled Deaths

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
Thymus	Number examined:	0	0	0	0	0	0	0	1
HEMORRHAGE(S)	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
INVLUTION/CORTICAL LYMPHOCYTOLYSIS	Minimal>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Thyroid	Number examined:	0	0	0	0	0	0	0	0
ULTIMOBANCHIAL REST(S)	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
ECTOPIC THYMIC TISSUE	Total Incidence of Finding Observed:	0	0	0	0	0	0	0	0
Trachea	Number examined:	0	0	0	0	0	0	0	1
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE	Nad>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	0
Urinary bladder	Number examined:	0	0	0	0	0	0	0	1
Uterus	Number examined:					0	0	0	1
LUMEN: DILATED	Moderate>					0	0	0	1
.....Total Incidence of Finding Observed:						0	0	0	1

All Diagnoses; Phases: P2; Death types: All unscheduled; Date of death range: 12-Jul-05 To 12-Jul-05

Liquified Petroleum Gas
A 13-Week Whole-Body Inhalation Toxicity Study in Rats with
Neurotoxicity Assessments and In Vivo Genotoxicity Assessments

Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:		Ctl's				Ctl's			
Dosage group:		2 3 4				2 3 4			
T i s s u e s W i t h D i a g n o s e s		No. in group:				No. in group:			
Brain		5	5	5	5	5	5	5	5
Number examined:		5	0	0	5	5	0	0	5
Cervical SC		5	0	0	5	5	0	0	5
BASOPHILIC/MINERAL FOCUS/FOCI									
Nad>		5	0	0	5	5	0	0	4
Minimal>		0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Dorsal Root Fibr		5	0	0	5	5	0	0	5
AXONAL SWELLING/DEGENERATION									
Nad>		3	0	0	4	5	0	0	4
Minimal>		2	0	0	1	0	0	0	1
.....Total Incidence of Finding Observed:		2	0	0	1	0	0	0	1
MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		4	0	0	3	3	0	0	3
Minimal>		1	0	0	1	1	0	0	1
Slight>		0	0	0	1	1	0	0	1
.....Total Incidence of Finding Observed:		1	0	0	2	2	0	0	2
Dorsal Root Gang		5	0	0	5	5	0	0	5
MIXED INFLAMMATORY CELL INFILTRATE									
Nad>		5	0	0	5	4	0	0	5
Minimal>		0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
Eyes		5	0	0	5	5	0	0	5
IRIS: SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
Nad>		5	0	0	4	5	0	0	5
Slight>		0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 26-Jul-05 To 27-Jul-05

Liquified Petroleum Gas
A 13-Week Whole-Body Inhalation Toxicity Study in Rats with
Neurotoxicity Assessments and In Vivo Genotoxicity Assessments

Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --				
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --				
Animal sex:										
Dosage group:		Ctls	2	3	4	Ctls	2	3	4	
T i s s u e s W i t h D i a g n o s e s		No. in group:	5	5	5	5	5	5	5	
Lumbar SC		Number examined:	5	0	0	5	5	0	0	5
BASOPHILIC/MINERAL FOCUS/FOCI										
		Nad>	4	0	0	4	5	0	0	5
		Minimal>	1	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:			1	0	0	1	0	0	0	0
MONONUCLEAR CELL AGGREGATES										
		Nad>	5	0	0	4	5	0	0	5
		Slight>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:			0	0	0	1	0	0	0	0
Lungs		Number examined:	5	5	5	5	5	5	5	5
HEMORRHAGE(S)										
		Nad>	5	2	1	1	1	4	3	5
		Minimal>	0	2	4	4	2	1	0	0
		Slight>	0	1	0	0	2	0	2	0
.....Total Incidence of Finding Observed:			0	3	4	4	4	1	2	0
CONGESTION										
		Nad>	0	0	0	0	1	1	1	0
		Minimal>	1	0	0	2	1	0	0	1
		Slight>	4	5	5	3	3	2	1	3
		Moderate>	0	0	0	0	0	2	3	1
.....Total Incidence of Finding Observed:			5	5	5	5	4	4	4	5
ALVEOLAR/INTRAALVEOLAR MACROPHAGES: FOAMY CYTOPLASM										
		Nad>	3	4	4	4	5	3	5	5
		Minimal>	1	1	1	1	0	1	0	0
		Slight>	1	0	0	0	0	1	0	0
.....Total Incidence of Finding Observed:			2	1	1	1	0	2	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 26-Jul-05 To 27-Jul-05

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Incidence Summary of Microscopic Findings with Severity Levels
Terminal Sacrifice

		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		5	5	5	5	5	5	5	5
Number examined:		5	5	5	5	5	5	5	5
Lungs									
ALVEOLAR/INTRAALVEOLAR INFLAMMATORY CELL INFILTRATE WITH									
-ALVEOLAR MACROPHAGES									
	Nad>	0	0	0	2	0	1	1	3
	Minimal>	2	4	5	3	5	3	4	2
	Slight>	3	1	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		5	5	5	3	5	4	4	2
ALVEOLAR/BRONCHIOLAR EPITHELIAL HYPERPLASIA									
	Nad>	5	5	4	3	1	5	4	4
	Minimal>	0	0	1	2	2	0	1	1
	Slight>	0	0	0	0	2	0	0	0
.....Total Incidence of Finding Observed:		0	0	1	2	4	0	1	1
INTRABRONCHIOLAR EOSINOPHILIC MATERIAL									
	Nad>	5	4	5	5	4	5	5	5
	Minimal>	0	1	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	1	0	0	1	0	0	0
PROMINENT BRONCHIOLAR ASSOCIATED LYMPHOID TISSUE									
	Nad>	5	2	4	4	2	2	3	1
	Minimal>	0	1	0	0	0	0	1	1
	Slight>	0	2	1	1	3	3	1	3
.....Total Incidence of Finding Observed:		0	3	1	1	3	3	2	4
INTERSTITIUM: OSSEOUS METAPLASIA									
	Nad>	5	5	5	4	5	5	5	5
	Slight>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	0
Optic nerve		5	0	0	5	5	0	0	5
Sciatic N/TB+PL		4	0	0	5	5	0	0	5

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		-- Animals --				Affected --			
Controls from group(s): 1		-- Males --				-- Females --			
		Ctl				Ctl			
Tissues With Diagnoses	No. in group:	5	5	5	5	5	5	5	5
Sciatic Nerve	Number examined:	5	0	0	5	5	0	0	5
AXONAL SWELLING/DEGENERATION									
	Nad>	5	0	0	5	4	0	0	4
	Minimal>	0	0	0	0	1	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	1
Stomach	Number examined:	0	0	0	0	0	0	0	1
SUPERFICIAL CELLULAR AND EOSINOPHILIC-GRANULAR DEBRIS									
	Slight>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1
Sural N/TB+PL	Number examined:	4	0	0	5	4	0	0	5
Sural Nerve	Number examined:	4	0	0	5	4	0	0	4
Thoracic SC	Number examined:	5	0	0	5	5	0	0	5
AXONAL SWELLING/DEGENERATION									
	Nad>	5	0	0	3	3	0	0	5
	Minimal>	0	0	0	2	2	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	2	2	0	0	0
Tibial N/TB+PL	Number examined:	4	0	0	5	5	0	0	5
Tibial Nerve	Number examined:	4	0	0	5	5	0	0	5
Trachea	Number examined:	5	5	5	5	5	5	5	5
SUBACUTE/CHRONIC INFLAMMATORY CELL INFILTRATE									
	Nad>	2	0	3	3	2	3	1	2
	Minimal>	3	3	2	2	3	1	4	3
	Slight>	0	2	0	0	0	1	0	0
.....Total Incidence of Finding Observed:		3	5	2	2	3	2	4	3

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		-- A n i m a l s --				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
T i s s u e s W i t h D i a g n o s e s		Ctls	2	3	4	Ctls	2	3	4
No. in group:		5	5	5	5	5	5	5	5
Trachea	Number examined:	5	5	5	5	5	5	5	5
SUBMUCOSAL GLANDULAR [DUCT] DILATATION									
	Nad>	4	1	2	4	3	3	3	3
	Slight>	1	4	3	1	2	2	2	2
.....Total Incidence of Finding Observed:		1	4	3	1	2	2	2	2
Trigeminal Gang	Number examined:	5	0	0	5	5	0	0	5
AXONAL SWELLING/DEGENERATION									
	Nad>	4	0	0	5	4	0	0	4
	Minimal>	1	0	0	0	1	0	0	1
.....Total Incidence of Finding Observed:		1	0	0	0	1	0	0	1
MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	5	0	0	4	5	0	0	5
	Slight>	0	0	0	1	0	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	1	0	0	0	0
MONONUCLEAR CELL AGGREGATES									
	Nad>	4	0	0	5	4	0	0	4
	Minimal>	0	0	0	0	0	0	0	1
	Slight>	1	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		1	0	0	0	1	0	0	1
MINERAL DEPOSIT									
	Nad>	5	0	0	5	4	0	0	5
	Minimal>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0
Urinary bladder	Number examined:	0	0	0	0	0	0	0	1
LUMINAL DISTENSION									
	Marked>	0	0	0	0	0	0	0	1
.....Total Incidence of Finding Observed:		0	0	0	0	0	0	0	1

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		-- A n i m a l s				A f f e c t e d --			
Controls from group(s): 1		-- M a l e s --				-- F e m a l e s --			
Animal sex:									
Dosage group:		Ctls	2	3	4	Ctls	2	3	4
T i s s u e s W i t h D i a g n o s e s	No. in group:	5	5	5	5	5	5	5	5
Ventrl Root Fibr	Number examined:	5	0	0	5	5	0	0	5
AXONAL SWELLING/DEGENERATION									
	Nad>	5	0	0	5	3	0	0	5
	Minimal>	0	0	0	0	2	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	2	0	0	0
MIXED INFLAMMATORY CELL INFILTRATE									
	Nad>	5	0	0	5	4	0	0	5
	Slight>	0	0	0	0	1	0	0	0
.....Total Incidence of Finding Observed:		0	0	0	0	1	0	0	0

All Diagnoses; Phases: P2; Death types: Scheduled FS; Date of death range: 26-Jul-05 To 27-Jul-05